FINAL

DOE/EA-1299

Environmental Assessment for the tment of Energy, Oak Ridge

U.S. Department of Energy, Oak Ridge Operations Receipt and Storage of Uranium Materials from the Fernald Environmental Management Project Site



FINDING OF NO SIGNIFICANT IMPACT

ENVIRONMENTAL ASSESSMENT FOR THE RECEIPT AND STORAGE OF URANIUM MATERIALS FROM THE FERNALD ENVIRONMENTAL MANAGEMENT SITE

AGENCY: U. S. DEPARTMENT OF ENERGY

ACTION: FINDING OF NO SIGNIFICANT IMPACT

SUMMARY: The U. S. Department of Energy (DOE) has completed an environmental assessment (DOE/EA-1299) for the receipt and storage of uranium materials from the Fernald Environmental Management (FEMP) Site. Based on the results of the impacts analysis reported in EA-1299, DOE has determined that the proposed action is not a major Federal action significantly affecting the quality of the human environment within the context of the National Environmental Policy Act of 1969 (NEPA). Therefore, the preparation of an environmental impact statement (EIS) is not necessary, and DOE is issuing this Finding of No Significant Impact (FONSI).

PUBLIC AVAILABILITY OF EA-1299 AND FONSI: The EA-1299 and FONSI may be reviewed at and copies of documents obtained from

U. S. Department of Energy Public Reading Room 230 Warehouse Road, Suite 300 Oak Ridge, Tennessee 37830 Phone: (423) 241-4780

Fernald Public Environmental Information Center 10995 Hamilton Cleves Highway Harrison, Ohio 45030 Phone: (513) 648-7480

Portsmouth Reading Room
U.S. DOE Environmental Information Center
U. S. 23 and Perimeter Road
P.O. Box 693
Piketon, Ohio 45661
Phone: (740) 289-3317

Paducah Reading Room U.S. DOE Environmental Information Center 175 Freedom Boulevard Kevil, Kentucky 42053 Phone: (502) 462-2550

CONTACT FOR FURTHER INFORMATION ON THE NEPA PROCESS:

David R. Allen NEPA Compliance Officer Oak Ridge Operations Office U. S. Department of Energy P. O. Box 2001 Oak Ridge, Tennessee 37831 Phone: (423)576-0411

BACKGROUND: The proposed action is to receive approximately 3800 metric tons of potentially marketable uranium material at an identified Oak Ridge Operations (ORO) site, or a combination of identified ORO sites. Identified ORO sites analyzed include storage area(s) at the Portsmouth Gaseous Diffusion Plant, Paducah Gaseous Diffusion Plant, Y-12 Plant, and East Tennessee Technology Park. This action is proposed so that the uranium material may be stored, rather than disposed of as waste, until a later time when its market potential can be realized.

The material receipt is needed to facilitate a decision of the U.S. Department of Energy to change the mission of the FEMP site to no longer include nuclear material storage. Removing this nuclear material inventory from the site by the end of fiscal year (FY) 1999 would greatly facilitate FEMP's ability to support commitments made to the state of Ohio regarding site cleanup.

ALTERNATIVES: In addition to the proposed action, impacts were also evaluated for the no-action alternative. Under this alternative, the uranium currently stored at the FEMP site would remain at the site. The uranium is currently stored in various container types including 55-gallon steel drums, T-hoppers, half-high boxes, and sea-land containers.

ENVIRONMENTAL IMPACTS:

No Action—Under normal operations, land use, geology and soils, water resources, cultural resources and the infrastructure would remain unchanged. Air effluents would be minimal and would remain the same as the present. Since there is no new construction and there are no effluents from the stored uranium, impacts to all resources are minimal. Radiological dose rates to facility workers, co-located workers and the public under normal operations are negligible. Under accident conditions, the highest radiological risk to the public is 0.63 rem from a storage fire and 0.84 rem to a co-located worker from an earthquake with aerial dispersion of uranium materials. Since the uranium materials would remain at the FEMP site, there is no change in these exposures or risks.

<u>Proposed Action</u>—Under the proposed action the FEMP uranium materials would be located at the Portsmouth Gaseous Diffusion Plant, the Paducah Gaseous Diffusion Plant, the East Tennessee Technology Park, the Y-12 Plant or a combination of these sites.

The proposed action has been analyzed for its potential impacts to the following resources at all of the above-mentioned identified sites:

- public and worker risk
- climate and air quality
- water resources

- geology and soils
- ecological resources
- socioeconomics and environmental justice
- land use
- infrastructure
- cultural resources

No significant construction or operational impacts are expected to occur due to the implementation of the proposed action at any of the ORO sites. Selection of plant sites that would or could require construction of storage facilities (Paducah Gaseous Diffusion Plant and/or the East Tennessee Technology Park) would convert approximately 1 acre of property from open grass habitat to buildings. Construction impacts for this development would be minimal because this area size is small in comparison to other similar available property located at each of these plants. At other sites, existing buildings would be used to store the uranium materials. Operational impacts, as well as routine handling risks, at the identified sites would be negligible.

Radiological risks to humans from all accident scenarios for all areas at all ORO locations are deemed to be low. For all accident scenarios at all sites the uranium metal toxicity to aquatic biota for both acute and chronic exposures would be negligible.

DETERMINATION: Based on the analysis of potential impacts, DOE has been determined that implementation of the proposed action does not constitute a major Federal action affecting the quality of the human environment at the Paducah Gaseous Diffusion Plant, the Portsmouth Gaseous Diffusion Plant, the Y-12 Plant, or the East Tennessee Technology Park. Public comments on the Draft EA were fully addressed in the Final EA. An Environmental Impact Statement is not required.

Issued at Oak Ridge, Tennessee, this 13 day of April 1999.

Steven S. Mihardon

Acting Manager

U. S. Department of Energy

Oak Ridge Operations

Oak Ridge, Tennessee

Final Environmental Assessment for the U. S. Department of Energy, Oak Ridge Operations Receipt and Storage of Uranium Materials from the Fernald Environmental Management Project Site

April 1999

Prepared by
Science Applications International Corporation
800 Oak Ridge Turnpike
Oak Ridge, Tennessee 37830

Prepared for U. S. Department of Energy Oak Ridge Operations Oak Ridge, Tennessee 37830

SCIENCE APPLICATIONS INTERNATIONAL CORPORATION

contributed to the preparation of this document and should not be considered an eligible contractor for its review.

TABLE OF CONTENTS

F	IGUR	RES	vi
		ES	
		NYMS	
1.	1N I 1.1	PURPOSE AND NEED FOR THE PROPOSED.	1-1
	1.2	TOM OUT WIND MEED FOR THE PROPOSED ACTION	
	1.2	SCOPE OF THIS ENVIRONMENTAL ASSESSMENT	1-1
2.	DES		
	2.1	SCRIPTION OF PROPOSED ACTION AND ALTERNATIVES	2-1
	2.2	BACKGROUND NO ACTION ALTERNATIVE PORTSMOLITH GASEOUS DEFLUCION BY	2-1
	2.3	PORTSMOUTH GASEOUS DIFFUSION PLANT	2-1
		2.3.1 Building X-3001	2-2
		2.3.2 Building X-3002	2-2
		2.5.5 Duliding X-//25A	
		2.3.4 A-7.43K Storage Tard	
		2.5.5 Ethiun Storage Dullullies	
		-is to Dunding M-744K	
	2.4		
	2.4 2.5	TIMOCIAI GABROOS DIFFUSION PLANT	
	2.6	1 12 1 12 MAI	
	2.0	LIBITENNESSEE TECHNOLOGY PARK	~ ~
		2.0.1 K-10001 Alea	
		== and it ost Dundings	2-6
	2.7		2-6
	2.8	COMBINATION OF SITES ALTERNATIVES CONSIDERED BUT ELIMINATED FROM	. 2-10
		FURTHER ANALYSIS	
		2.8.1 Commercial Facilities 2.8.2 Oak Pidge National Laboratory	2-10
		2.0.2 Oak Ridge National Laboratory	
		2.8.3 Other DOE Sites	. 2-10
3.	AFFE	ECTED ENVIRONMENT	2.1
	3.1	TELEVIED ENVIRONMENTAL MANAGEMENT PROJECT	2 1
		3.1.1 Fublic and worker Risk	2.1
		3.1.2 Climate and Air Quanty	
		5.1.5 Water Resources	2.2
		5.1.4 Geology and Solis	2.2
		5.1.5 Leological Resources	2.2
		5.1.6 Socioeconomics and Environmental Justice	2.2
		5.1.7 Land OSC	2 2
		This minds dolder	. 3-3
		3.1.9 Cultural Resources	3-3

3.	.2 PORTSMOUTH GASEOUS DIFFUSION PLANT 3.2.1 Public and Worker Piek	2.4
	- in a more that worker Kisk	
	- in the did Air Quality	
	sizes water resources	
	oracle Georgy and Bons	
	Louis Education (Capation Capation Capa	
	3.2.6 Socioeconomics and Environmental Justice	. 3-5
	5.2.7 Dance OSC	
	3.2.8 Infrastructure	. 3-6
3.3	PADUCAH GASEOUS DIFFUSION PLANT 3.3.1 Public and Worker Rick	. 3-6
	3.3.1 Public and Worker Risk	. 3-6
	3.3.2 Climate and Air Quality	. 3-6
	3.3.3 Water Resources	. 3-6
	3.3.4 Geology and Soils	. 3-7
	3.3.5 Ecological Resources	. 3-7
	3.3.6 Socioeconomics and Environmental Justice	. 3-7
	3.3.7 Land Use	. 3-7
	3.3.7 Land Use 3.3.8 Infrastructure 3.3.9 Cultural Resources	. 3-8
	3.3.9 Cultural Resources	. 3-8
3.4	3.3.9 Cultural Resources Y-12 PLANT 3.4.1 Public and Worker Birls	3-8
	3.4.1 Public and Worker Risk	3-8
	3.4.1 Public and Worker Risk	3-9
	3.4.2 Climate and Air Quality	3-9
	3.4.3 Water Resources 3.4.4 Geology and Soils	3-9
	3.4.4 Geology and Soils 3.4.5 Ecological Resources	3-10
		3-10
	3.4.6 Socioeconomics and Environmental Justice 3.4.7 Land Use	3-10
	3.4.7 Land Use 3.4.8 Infrastructure	-11
	3.4.8 Infrastructure 3.4.9 Cultural Resources	-11
3.5	The state of the s	-11
	3.5.1 Public and Worker Rick	-11
	3.5.1 Public and Worker Risk	-12
	3.5.2 Climate and Air Quality 3.5.3 Water Resources	-12
	3.5.3 Water Resources	-12
	a a a a By mad bolls	-13
		-13
		-14
		-14
		-14
	3.5.9 Cultural Resources	-14
ENV	/TRONMENTAL CONSEQUENCES	
4.1	VIRONMENTAL CONSEQUENCES PUBLIC AND WORKER BISK	4-1
4.2	- OBBIOTE WORKER KISK	
	TO RETOR ALTERNATIVE	
	4.2.1 William Operations	
4.3	T.2.2 ACCIDENS	
1.5	TOKISMOOTH GASEOUS DIFFUSION PLANT	
	7.5.1 Itornal Operations	
	4.3.2 Accidents	1.5

4.

	4.4	PADUCAH GASEOUS DIFFUSION PLANT
		4.4.1 Normal Operations
		4.4.2 Accidents 4-5
	4.5	4.4.2 Accidents
		Y-12 PLANT
		4.5.1 Normal Operations
	4.6	4.5.2 Accidents
		EAST TENNESSEE TECHNOLOGY PARK 4.6.1 Normal Operations 4-8
		The state operations,
	4.7	Troudents
	4.8	
		CUMULATIVE IMPACTS
5.	REFE	RENCES
- •		ERENCES 5-1
6.		
٠.	2101	OF PREPARERS 6-1
•	2201	OF AGENCIES/INDIVIDUALS CONSULTED
ΑF	PEND	ICFS
	* D. 1D	
Α	DOF.	FEMP NEDA Covernos for Discussion Covernos
В	FEME	FEMP NEPA Coverage for Disposition of Nuclear Material Inventory
D		** * 100 MILE PROTECTION OF THE PROTECTION OF TH
E		
_	COMM	ents and Responses

FIGURES

2.1	Current Uranium Storage Locations at FEMP Portsmouth Gaseous Diffusion Plant with D
2.2	2 of torrough Ouscouts Diffusion Flam With Proposed Henry Proposed Character T
2.3	- waddan Cascous Dillusion I lain will Proposed I manuum Ctorogo I:
2.4	- 12 1 min will I doodd Offillill Glorab i Ocatione
2.5	East Tennessee Technology Park with Proposed Uranium Storage Locations
	2-9
	TABLES
2.1	FEMP Uranium Proposed for Receipt and Storage at Other DOE Site(s)
3.1	Topulation, modifie, and Employment in the Fernald Region of Influence for
3.2	Hamilton County and Cincinnati Metropolitan Statistical Area
3.2	r openition, moonic, and employment in the Portsmouth Region of Influence for
3.3	rike County and Scioto County
٥.٥	* operation, medite and employment in the P(1) P Region of Influence for
2.4	McCracken County
3.4	- operation, modific, and Elliphovillell in the Y-17 plant Degree of the first of
	Anderson County and Roane County

ACRONYMS

ARF airborne release fraction best management practice **BMP DCF** dose conversion factor **DCG** derived concentration guide U.S. Department of Energy DOE DR damage ratio EA Environmental Assessment **EPA** U.S. Environmental Protection Agency

ETTP East Tennessee Technology Park

FEMP Fernald Environmental Management Project

FTE full-time equivalent

GCEP Gas Centrifuge Enrichment Plant

HQ hazard quotient

HVAC heating, ventilation, and air conditioning

LLW low-level radioactive waste

MAR material at risk

MSA Metropolitan Statistical Area

MTU metric tons of uranium

NAAQS National Ambient Air Quality Standards NEPA National Environmental Policy Act

O/H overhead

ORNL Oak Ridge National Laboratory

ORO Oak Ridge Operations
ORR Oak Ridge Reservation

PGDP Paducah Gaseous Diffusion Plant PORTS Portsmouth Gaseous Diffusion Plant prevention of significant deterioration

RF respirable fraction ROI region of influence

SHPO State Historic Preservation Officer
TSCA Toxic Substances Control Act
tension-support structure

TVA Tennessee Valley Authority

1. INTRODUCTION

1.1 PURPOSE AND NEED FOR THE PROPOSED ACTION

Through a series of material transfers and sales agreements over the past 6 to 8 years, the Fernald Environmental Management Project (FEMP) has reduced its nuclear material inventory from 14,500 to approximately 6800 metric tons of uranium (MTU). This effort is part of the U.S. Department of Energy's (DOE's) decision to change the mission of the FEMP site; it is currently shut down and the site is being remediated. Removing this remaining nuclear material inventory from the site by the end of fiscal year (FY) 1999 would greatly facilitate FEMP's ability to support commitments made to the state of Ohio regarding site cleanup. Interest in the material has been expressed by the U.S. Department of Defense and other commercial ventures. However, the timing for transfer will not support the regulatory commitments. Of the remaining inventory there are approximately 3800 metric tons of potentially marketable uranium material. It would be in the best interest of DOE to maintain and eventually market or use these materials. Oak Ridge Operations (ORO) has committed to receiving and storing the material at an undetermined site. The purpose of, and need for, this action is to receive this material at an acceptable site, or sites, so that its market value can be realized rather than disposing of the material as waste. Approximately 800 metric tons of low-enriched uranium (LEU) are currently in the process of being sold by the Ohio Field Office. Should this sale not go through, then these materials would need to be stored until reused or sold; the LEU is part of the 3800 metric tons evaluated in this Environmental Assessment (EA).

1.2 SCOPE OF THIS ENVIRONMENTAL ASSESSMENT

This EA focuses on the receipt and storage of uranium materials at various DOE-ORO sites. The packaging and transportation of FEMP uranium material has been evaluated in previous NEPA and other environmental evaluations. A summary of these evaluation efforts is included as Appendix A. The material would be packaged in U.S. Department of Transportation-approved shipping containers and removed from the FEMP site and transported to another site for storage. The Ohio Field Office will assume responsibility for environmental analyses and documentation for packaging and transport of the material as part of the remediation of the site, and ORO is preparing this EA for receipt and storage at one or more sites.

99-015P(wp8)/040599

2. DESCRIPTION OF PROPOSED ACTION AND ALTERNATIVES

2.1 BACKGROUND

DOE proposes to place up to 3800 MTU of nuclear materials product currently stored at the FEMP site at another suitable DOE site. This includes the approximately 800 metric tons of LEU currently out for bid. If the 800 metric tons out for bid are not sold expeditiously, then it is proposed that the LEU would also be moved to another DOE site. Uranium to be moved from the FEMP site to another site includes normal uranium [same assay as natural uranium $(0.711\%^{235}\text{U})$ but created by a man-made process], depleted uranium (assay less than natural uranium), and LEU (assay >0.711% and <20%). Table 2.1 provides a summary of the uranium inventory at the FEMP site, relative amounts of each type, and the approximate storage space required for each type. Appendix B provides more detail on each type of uranium with a breakdown of each type according to its composition (metal, UF₄, etc.).

Table 2.1. FEMP Uranium Proposed for Receipt and Storage at Other DOE Site(s)

Uranium	Pounds (millions)	Metric Tons Uranium (MTU)	Storage Space Requirements (approximate in ft²)
Normal	0.434	193	600
Depleted	7.085	2,761	17,200
Low-Enriched	<u>2.205</u>	<u>_799</u>	<u>12,500</u>
TOTALS	9.724	3,753	30,300

Five DOE site alternatives, Portsmouth Gaseous Diffusion Plant (PORTS), Paducah Gaseous Diffusion Plant (PGDP), Oak Ridge National Laboratory (ORNL), the Y-12 Plant, and the East Tennessee Technology Park (ETTP), were considered for receipt and storage of these materials. At some of these DOE sites, various locations/building variations were considered. Storage at a licensed, commercial facility was also considered initially but was ruled out because of schedule constraints. The no action alternative is to leave the uranium at FEMP.

Receipt and storage of the uranium products would require that suitable existing buildings with sufficient floor space at the various DOE sites be made available. Approximately 50,000 ft² of space is required, and buildings would have to be available in time to receive all product before the end of the fourth quarter of FY 1999. Alternatively, if existing buildings are not available, an area where at least two tension-support structures (TSSs) could be built would have to be identified (or a combination thereof). These TSSs would have concrete floors, a rigid frame, and tarpaulin roof and sides, and they would provide approximately 27,000 ft² each in storage space. DOE inventoried buildings and space availability at five sites—Portsmouth, Ohio; Paducah, Kentucky; and three sites (the Y-12 Plant, ORNL, and ETTP) in Oak Ridge, Tennessee. As noted in Sect. 2.8, the ORNL site was dropped from consideration due to mission-related land use conflicts.

2.2 NO ACTION ALTERNATIVE

Under this alternative, the uranium currently stored at the FEMP site would remain at the site. The uranium is currently stored in various container types including 55-gallon steel drums, T-hoppers, half-high boxes, and sea-land containers. A description of these containers is provided at the end of Appendix B.

Currently, the nuclear material is predominantly located in Buildings 4B, 77, and 54B but would be moved to TS-4 and TS-5 at Plant Pad 1. The nuclear material would be located in two TSSs in the northwest quadrant of the site (see Fig. 2.1). Since a No Action alternative would leave uranium materials in place at FEMP, it does not support a regulatory commitment made to the state of Ohio.

2.3 PORTSMOUTH GASEOUS DIFFUSION PLANT

Under this alternative, the DOE PORTS site in Piketon, Ohio, would receive and store up to 3800 MTU product from the FEMP site. The uranium would be stored in some existing buildings or in a storage yard. Eight location alternatives within the PORTS site are considered (Fig. 2.2).

2.3.1 Building X-3001

Building X-3001 is a very large building formerly used as a process building. This single-story building has an 87-ft ceiling and is comprised of four 630- by 104-ft bays. Each bay is equipped with a serviceable 7.5-ton crane. All bays have existing fire suppression and are heated and well lighted. Part of this building is still being used to store some Gas Centrifuge Enrichment Plant (GCEP) equipment as well as waste materials. Over 50,000 ft² of space is available, and all the Fernald nuclear material could be stored here. Building X-3001 is located in the southwest portion of the PORTS site, just north of Lewis Street (Fig. 2.2).

2.3.2 Building X-3002

Building X-3002 is identical to Building X-3001 except this building is empty and has no contamination. The building could easily store all the Fernald nuclear materials. Building X-3002 is located immediately east of Building X-3001 and near the corner of Grebe Avenue and Lewis Street (Fig. 2.2).

2.3.3 Building X-7725A

Building X-7725A is referred to as the GCEP Waste Accountability Facility; it is a one-story light steel and metal-clad structure. Building X-7725A is located east of the Perimeter Road and Contractor Access Road (Fig. 2.2). This building is being used as a Toxic Substances Control Act (TSCA) building (used to store polychlorinated biphenyls) and has a sealed, curbed floor for this purpose. It has approximately 29,400 ft² of floor space and is currently about half full. The building has an overhead (O/H) fire suppression sprinkler system and is well lighted. The building also is equipped with a radiation detection system.

2.3.4 X-7745R Storage Yard

This storage yard is located north of Rush Street and north of Building X-3002 (Fig. 2.2). There is sufficient space here to construct two TSSs and to store all the Fernald nuclear material proposed for receipt and storage. A concrete pad is already in place; however, the pad is currently used for the storage of low-level radioactive waste (LLW) containers and appears to be completely full. The existing LLW would obviously have to be moved to another area before this storage yard could be used for uranium storage.

2.3.5 Lithium Storage Buildings

Buildings X-744S, X-744T, and X-744U were used for lithium storage. Buildings X-744U and X-744S are physically connected and, combined, provide sufficient floor space (48,000 ft² in X-744S and 98,000 ft²

FORMER BURN PIT

무

M

18X

PIT #2

91A

918

TS-4

88

91C

SECONDARY BUILDINGS
SECONDARY BUILDINGS
SECONDARY ROADS
PRIMARY ROADS
PRIMARY ROADS
SECONDARY ROADS
RAILROAD TRACKS
FUCE LINE
CREEK OR STREAM
DITCH
BERM

E 1900

N -3050

34B

(34A)

20J

20J

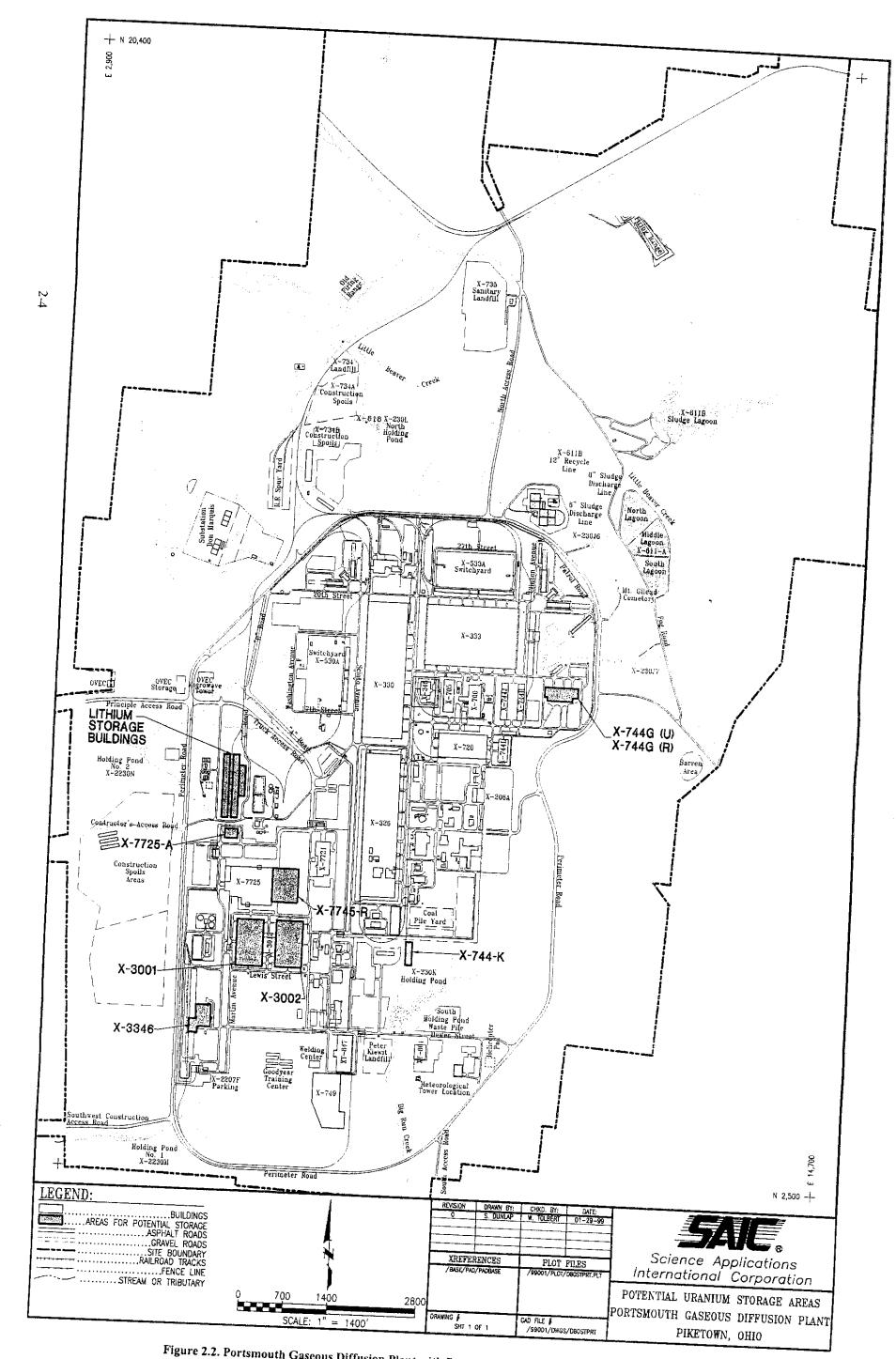


Figure 2.2. Portsmouth Gaseous Diffusion Plant with Proposed Uranium Storage Locations

in X-744U). Some clean-out and painting will have to be done, and lighting will have to be installed. A 30-by 40-ft concrete receiving dock would be constructed immediately adjacent to Building X-744U beside "C" Road which runs west of, and parallels the length of, the buildings (Fig. 2.2). Building X-744T is the westernmost of the three former lithium storage buildings and would likely require the most upgrading. It has approximately 98,000 ft² of available floor space. Access to this building would be from an unnamed road paralleling the building to the west, and a receiving dock would be needed for this building as well. The buildings heights vary from approximately 14 ft at the eaves to approximately 22 ft at the center of the buildings. The buildings are equipped with an O/H fire suppression sprinkler system, but the sprinklers are currently disconnected from the fire water mains and are no longer functional. There is no lighting or heating because the electric power has been disconnected. These buildings are currently used for lithium hydroxide drum storage. This material is gradually being sold commercially and removed offsite.

2.3.6 Building X-744K

Building X-744K is a relatively small structure (36,000 ft²) located approximately 800 ft north of the X-230K South Holding Pond and just south of 2nd Street. This building was formerly used as a lithium warehouse. The building has been empted of lithium and is currently leased to the Ohio Army National Guard for storage of military vehicles. Big Run Creek shows as a "blue line" (permanent) stream within 200 ft of Building X-744K.

2.3.7 Building X-744G

Building X-744G is located south of 18th Street between Brown Avenue and Athens Avenue at the northeast corner of the PORTS site. It has 107,000 ft² available for storage. The interior height of the building is approximately 22 ft. The building is equipped with an O/H fire suppression dry-pipe sprinkler system and is well lighted. The building is equipped with a criticality alarm system but is not heated. This warehouse is currently used to store some uranium oxide and contaminated alumina trap material.

2.3.8 Building X-3346

This building is referred to as the GCEP Feed and Withdrawal Facility and is a two-story heavy structural steel and metal-clad building with concrete floors on both the first and second levels. This building encompasses approximately 110,000 ft², and the first floor is basically divided into three large rooms. One of the rooms is a high bay area which was to be the Autoclave area. The concrete floor throughout this area is at various elevations, and container storage in this area would be difficult. A considerable amount of floor space in the other areas is taken up by abandoned process piping and equipment which has not been removed.

The building is equipped with an O/H fire suppression sprinkler system and is heated and well lighted. Based on the current use of the building, the combustible loading is moderate and primarily consists of hydraulic fluids, gas cylinders, lubricants, and other associated materials required for vehicle maintenance activities.

This building is currently being leased to the Ohio Army National Guard and is used for miliary vehicle maintenance and storage, as well as parts and maintenance material storage.

2.4 PADUCAH GASEOUS DIFFUSION PLANT

A greenfield/brownfield site inside the DOE Paducah site boundary would be used. Two TSSs and an off-loading dock would be built and the uranium stored in the TSSs. Figure 2.3 shows the proposed location for the TSSs. They will be oriented east-west in an open field which is just west of 10th street and north of Virginia Avenue and Building C-752.

2.5 Y-12 PLANT

Two buildings, 9204-4 and 9720-33, are proposed for receipt and storage of the FEMP site nuclear materials. Building 9204-4 has approximately 5,000 ft² of space available, and Building 9720-33 has 40,000 ft². Combined, the buildings have approximately 45,000 ft² of potentially available space—5,000 ft² less than the maximum space estimated to be needed. Building 9720-33 has material in it that would require removal before use as a uranium storage facility. Building 9204-4 is located toward the west end of the Y-12 Plant near the Bear Creek Portal. The building is located south of First Street and west of "J" Road (Fig. 2.4). Building 9720-33 is located southwest of Building 9204-4, between Second Street and West Third Street.

2.6 EAST TENNESSEE TECHNOLOGY PARK

Three sites were evaluated at the ETTP (Fig. 2.5). This site was formerly named the Oak Ridge Gaseous Diffusion Plant (ORGDP) and often referred to as the K-25 Site.

2.6.1 K-1066F Area

One site, K-1066F, is a paved lot immediately south of the UF₆ cylinder yard (K-1066-J). This site is approximately 150 ft south of Poplar Creek at its closest point and immediately north of 19th Street. It is an open lot with sufficient space to construct two TSSs and store all the uranium materials from the FEMP site (Fig. 2.5).

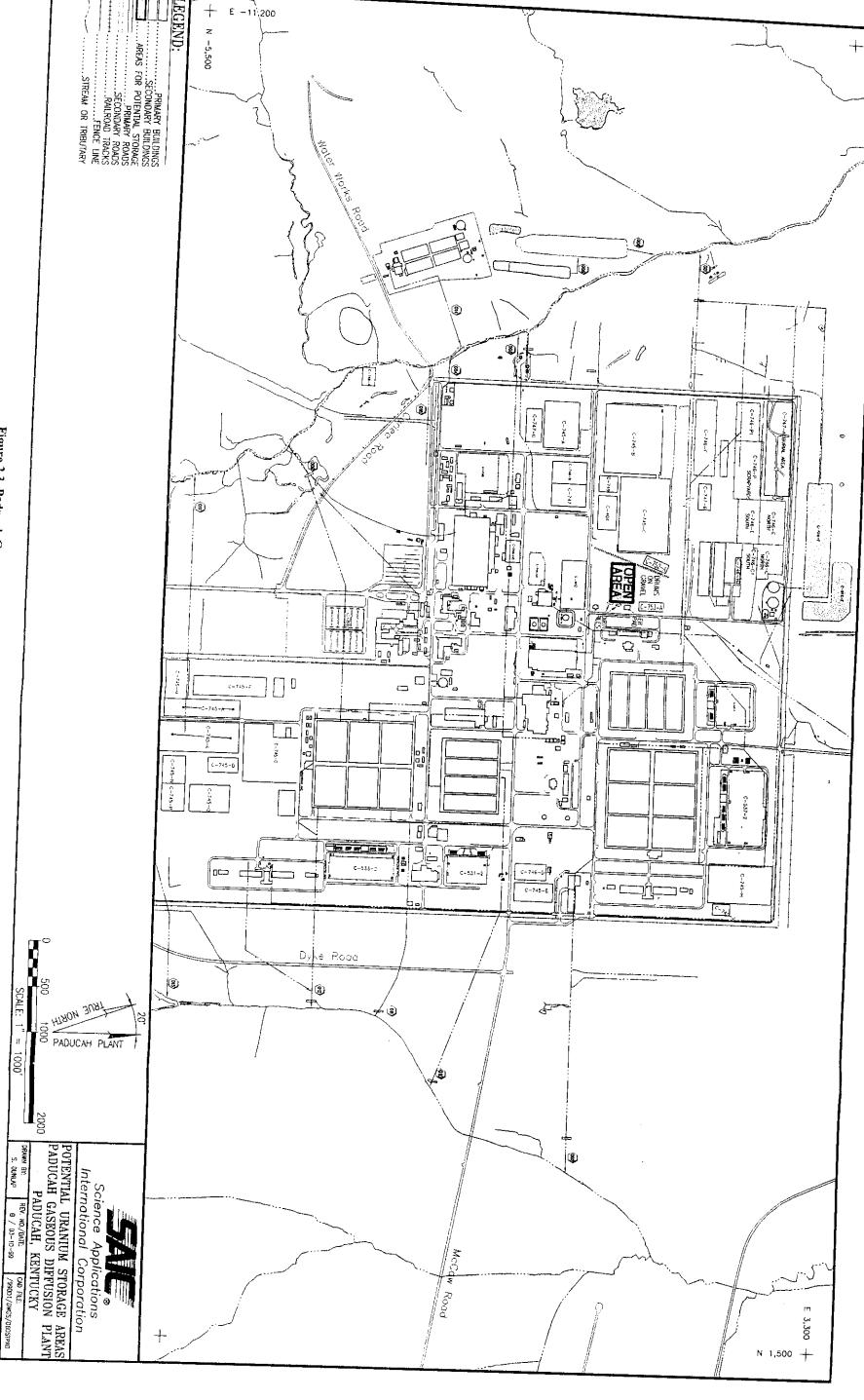
2.6.2 K-131 and K-631 Buildings

The basement floor of each building is available for use. The basement floor is the ground-level floor on the north side of each building and would be accessed from this side. Building K-131 has a nominal basement floor space of 19,902 ft² with usable space of approximately 17,900 ft². Building K-631 has approximately 14,000 ft² of usable space in two wings of the basement. The nominal basement size is 22,765 ft². Thus, both buildings would have approximately 31,900 ft², which is less than the minimum space requirement to store all the FEMP site materials.

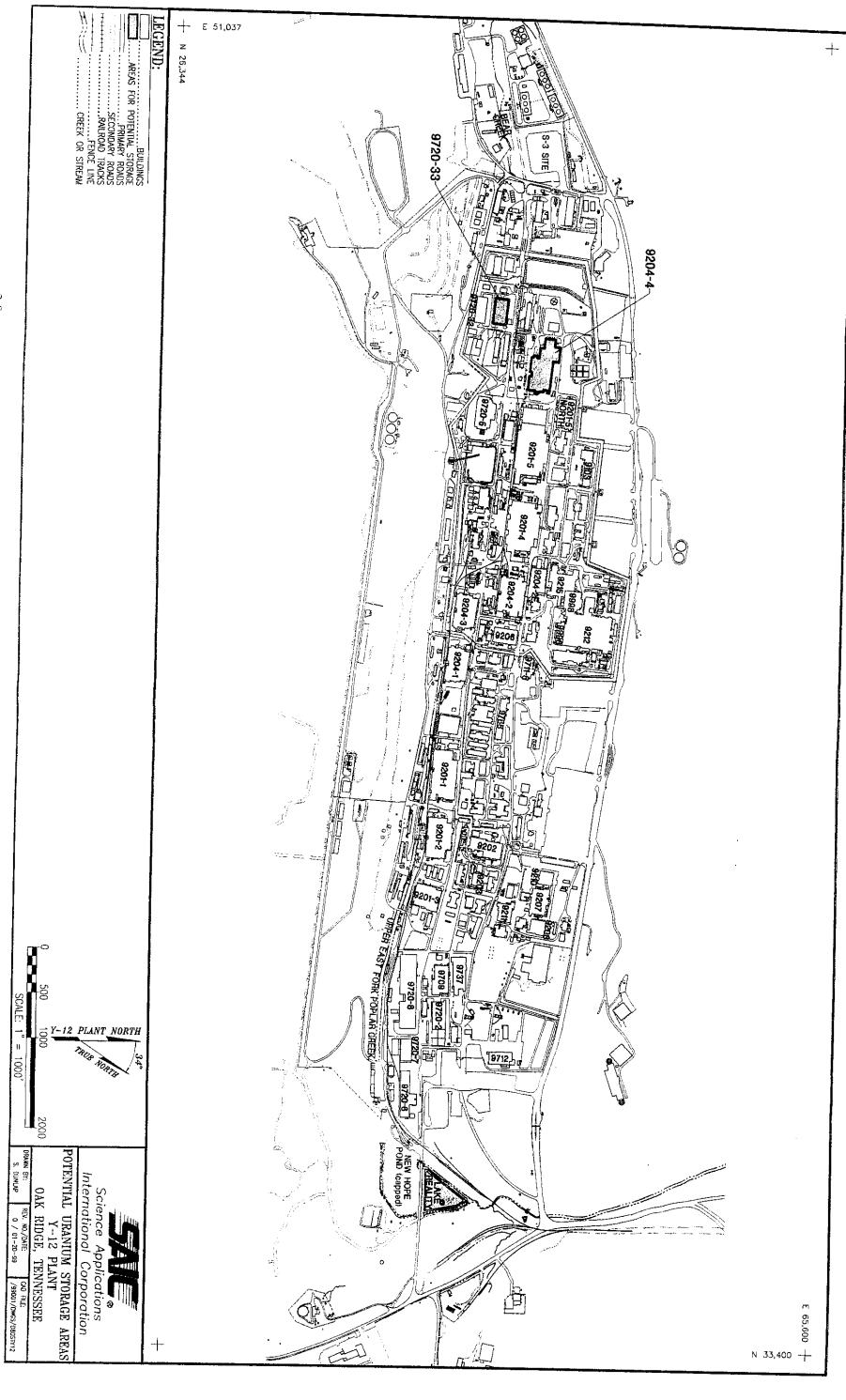
These buildings are approximately 200 ft south of Poplar Creek at its closest point.

2.6.3 K-861 Open Area

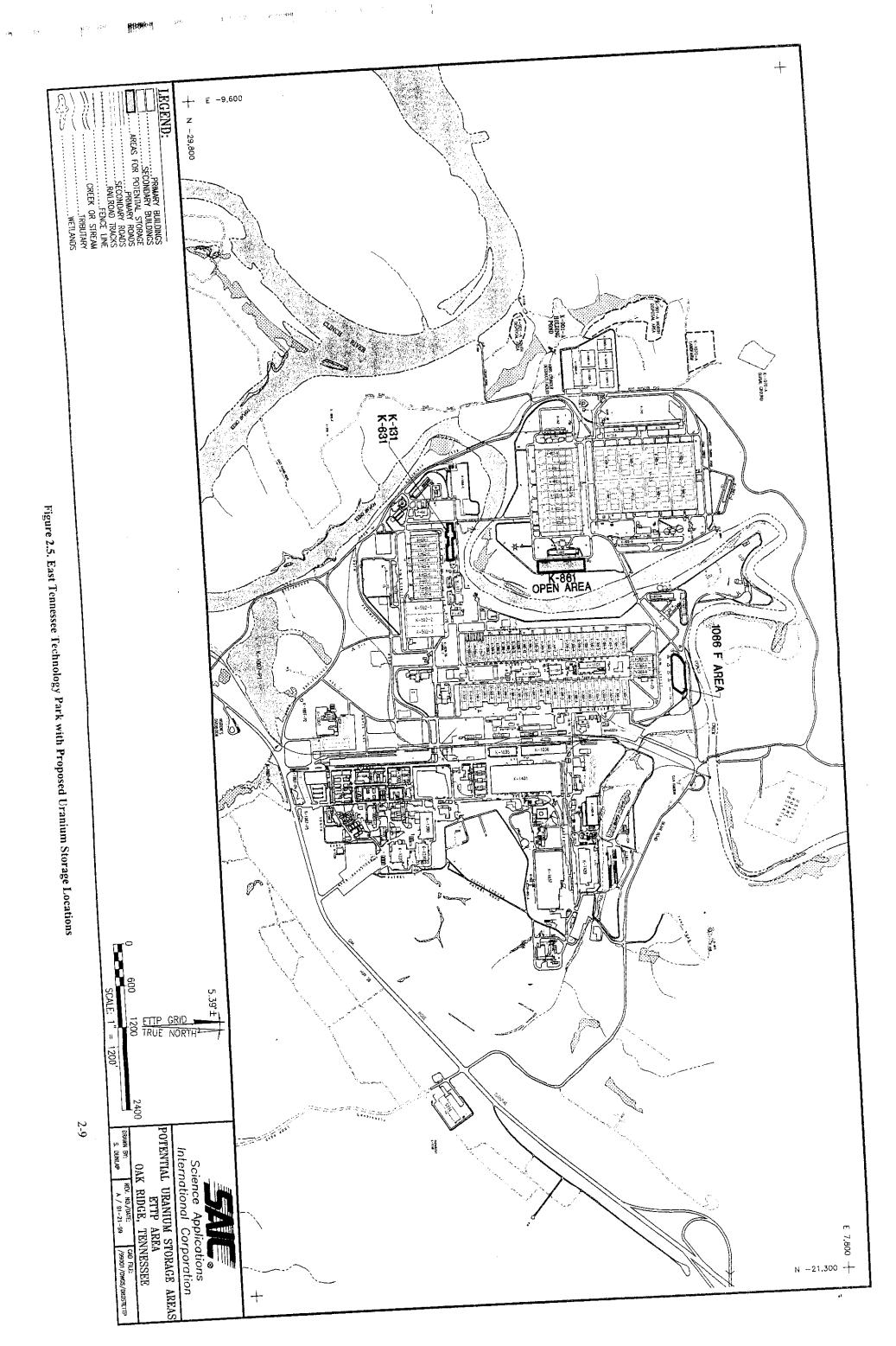
This large, open area is immediately east of Building 861 and immediately west of Avenue North. This area is approximately 300 ft west of Poplar Creek (Fig. 2.5). The area is large enough to construct the two TSSs needed to store all the Fernald nuclear materials. This site has been identified as having some existing



E -11,200



ç



radiological contaminants in the soil; however, the risk from these contaminants was less than 1×10^{-4} excess cancer risk to workers.

2.7 COMBINATION OF SITES

DOE would consider storing the nuclear materials at a combination of sites if multiple sites are environmentally acceptable. If multiple sites prove to be environmentally acceptable and, individually, each site can receive and store all of the nuclear material, then placement of some of the material at one site and other materials at another site should also be environmentally acceptable. Other mission-related factors may be considered in placing the materials in this event.

2.8 ALTERNATIVES CONSIDERED BUT ELIMINATED FROM FURTHER ANALYSIS

2.8.1 Commercial Facilities

Some commercial facilities exist that have appropriate uranium and radiological licenses. However, the requirement to have all the uranium moved from the FEMP site by September 30, 1999, precludes consideration of any commercial facilities. There is not enough time to prepare and issue a competitive request for proposal, to evaluate proposals including license validations, and to award a contract to commercial vendor(s). Therefore, this alternative was not considered further.

2.8.2 Oak Ridge National Laboratory

There were no buildings or spaces identified for storage of uranium materials at this site that would not conflict with the research mission of the Laboratory. Therefore, ORNL was not considered further as a potential site.

2.8.3 Other DOE Sites

Management of uranium is an integral part of DOE-ORO work. This, combined with the stringent schedule for removing these uranium materials from FEMP to support compliance with regulatory requirements, necessitated that only sites under the administrative control of ORO be considered.

3. AFFECTED ENVIRONMENT

3.1 FERNALD ENVIRONMENTAL MANAGEMENT PROJECT

The Fernald site is currently termed the FEMP site and was formerly known as the Feed Materials Production Center. The site is located just north of Fernald, Ohio, in southwest Ohio about 17 miles northwest of downtown Cincinnati. The 1050-acre site began operation in 1952 with its primary mission to purify uranium metal and uranium compounds for use at other DOE defense facilities. A small amount of thorium processing has also been conducted at the FEMP site (DOE 1997b). By the late 1980s production was suspended, and the site's mission changed from uranium production to site environmental restoration.

3.1.1 Public and Worker Risk

The uranium currently stored in Buildings 54B, 77, and 4B will be consolidated at one location (Plant Pad 1) where two TSSs are available for long-term storage. During storage of uranium, materials workers could be exposed to direct radiation from surface contamination on the storage containers. However, the containers have been checked and overpacked if deemed necessary. Therefore, worker exposure due to routine operations associated with surveillance and maintenance of stored materials is expected to be less than detectable levels.

In addition to surface contamination, a radiation dose from the stored uranium materials can be expected. Dose rates from any single stored container are no more than 3 to 4 mrem/h. The dose rate at a distance of 1 ft from a container is ~1 mrem/h, and the dose rate at a distance of 20 ft is <0.5 mrem/h (approximately the same as normal background radiation doses) (personal communication with Scott Tolar, Fernald Site, with Carol Mason, SAIC, January 13, 1999). These dose rates are not affected by stacking the containers because the containers and the materials themselves provide significant shielding.

The radiological risk associated with various accident scenarios is presented in detail in Appendix C. In summary, the risks for various accident scenarios were calculated for the public, the facility worker, and the co-located worker at the FEMP site. Doses to the facility worker, co-located worker, and the public associated with general handling accidents, storage area fires, and seismic events are summarized in Table 4.1 in Sect. 4. The highest radiological risk to the public (0.63 rem dose) is from a storage area fire and to the co-located worker (0.84 rem) is from an earthquake with aerial dispersion of uranium materials.

3.1.2 Climate and Air Quality

Prevailing winds are from the south-southwest 12% of the time; calm winds occur 4% of the time. The annual average wind speed recorded at the Greater Cincinnati Airport was 9 mph with 1-min sustained winds of up to 46 mph. Average monthly temperatures of 32°F to 88°F were recorded in 1992. Precipitation for the year was 38 in., and the monthly maximum was 7 in. in July (DOE 1997b).

Hamilton and Butler counties are classified as "moderate nonattainment" areas for ozone; these counties are in attainment for the remaining five criteria pollutants. The major source of air pollution at the FEMP site is the boiler plant.

3.1.3 Water Resources

Surface Water

Major surface water features include Paddy's Run, which drains into the Great Miami River and ultimately into the Ohio River. There are no federally designated Wild and Scenic Rivers near to and downstream of the site. The site is located within the 100-year and 500-year floodplains of Paddy's Run. Wastewater is discharged to on-site streams and the Great Miami River.

Groundwater

The site is underlain by the Great Miami Buried Valley Aquifer, which is a sole-source aquifer.

3.1.4 Geology and Soils

The FEMP site lies on a terrace above the Greater Miami River Valley, with glacial features dominating the landscape. Bedrock consists of sedimentary shales and limestone approximately 60 to 200 ft below the ground surface. The bedrock forms the floor and valley walls of the New Haven Trough. No major geologic faults have been mapped in the area (DOE 1997b).

The dominant soils at the site are silty loams of glacial origin. These soils are poorly drained, occur on relatively flat surfaces, have low permeability, and experience seasonal saturation. There is little likelihood of risk from subsidence, earthquakes, or volcanic activity.

3.1.5 Ecological Resources

Vegetation consists of non-native grasses, pine plantations, deciduous woodlands, and riparian woodlands. Ecologically important habitat includes mature woodlands; pine plantations for wildlife species, such as white-tailed deer and the eastern cottontail rabbit; and riparian woodlands. Cattle grazing and brush clearing have resulted in habitat fragmentation and reduction in wildlife corridors. A total of 35.9 acres of freshwater wetlands (palustrine forested, drainage ditches/swales, and isolated persistent emergent and scrub/shrub wetlands) have been delineated at the FEMP site. There are no federally protected threatened or endangered species known at the FEMP site; however, excellent habitat exists for the Federally-endangered Indiana Bat in site riparian woodlands and the state-threatened Sloan's Crayfish inhabits portions of Paddy's Run Creek.

3.1.6 Socioeconomics and Environmental Justice

Socioeconomics

The region of influence (ROI) for the Fernald site could be defined as either Hamilton County, Ohio, or the Cincinnati Metropolitan Statistical Area (MSA), since Hamilton County includes most of Cincinnati. This analysis focuses on the smaller economic unit of Hamilton County, a conservative definition designed to identify the maximum potential impact. Table 3.1 summarizes population, per capita income, and wage and salary employment for both Hamilton County and the Cincinnati MSA between 1991 and 1996, the last year for which figures were available. The Cincinnati MSA includes counties in Ohio, Kentucky, and Indiana. Cincinnati is a relatively large urban area, with a population of nearly 1.9 million and wage and salary employment over 984,000. Hamilton County represented about half of the population in the MSA and

Table 3.1. Population, Income, and Employment in the Fernald Region of Influence for Hamilton County and Cincinnati Metropolitan Statistical Area

Region/Variable	1991	1992	1993	1994	1995	1996	Growth 1991-96
Ohio							
Hamilton County							
Population	868,586	869,659	869,397	865,213	860,391	855,800	-0.30%
Per Capita Pers. Inc. (\$)	22,444	23,768	24,774	25,728	27,321	28,690	5.03%
Total Personal Income (Mil.\$)	19,495	20,670	21,538	22,260	23,507	24,553	4.72%
Wage & Salary Employment	567,054	568,608	570,200	579,674	586,195	596,485	1.02%
Cincinnati-Hamilton Oh-Ky-In							
Population	1,842,551	1,861,177	1,881,694	1,894,377	1,906,832	1,919,010	0.82%
Per Capita Pers. Inc. (\$)	19,772	20,869	21,636	22,511	23,787	24,901	4.72%
Total Personal Income (Mil.\$)	36,431	38,841	40,712	42,644	45,358	47,785	5.58%
Wage & Salary Employment	885,496	895,824	909,756	934,009	959,697	984,055	2.13%

60% of wage and salary employment, at 596,000. Total personal income was over \$24 billion, approximately half the total for the Cincinnati MSA (U.S. Bureau of Economic Analysis 1998).

Environmental Justice

There are no federally recognized Native American tribes present near the site. There are no minority or low-income populations within 5 miles of the FEMP site (DOE 1997b).

3.1.7 Land Use

The site covers an area of 1050 acres, of which 275 acres are developed. Of the area that is undeveloped, 195 acres are considered environmentally sensitive. Land use around the site is predominantly agricultural.

3.1.8 Infrastructure

A public water system provides an average of 0.4 million gallons of water per day. An on-site wastewater treatment plant treats an average of 2.18 million gallons of sewage per day and discharges treated effluent to the Great Miami River. The Cincinnati Gas and Electric Company supplies power to the site; average loads are 33 MW. Transportation in the region consists of roads (State Road 126 and U.S. Route 27) and interstates (275 and 74). Rail access is by the Baltimore and Ohio Railroad, which is 3 miles west of the site.

3.1.9 Cultural Resources

Native American occupation of the FEMP area began about 14,000 years ago. European settlement began during the late Eighteenth Century. The site has 42 recorded archaeological sites, standing structures, or traditional cultural properties. Sixty-one percent of this site has been subject to a comprehensive cultural resources survey. Three areas are eligible for inclusion on the National Register of Historic Places.

3.2 PORTSMOUTH GASEOUS DIFFUSION PLANT

PORTS is located approximately 22 miles northeast of Portsmouth in Pike County, Ohio, occupying an area of 3,714 acres. Construction of the site began in late 1952 and ended in 1956, one year after the start of uranium enrichment processing at the site. On July 1, 1993, DOE leased portions of PORTS to the United States Enrichment Corporation for the purpose of managing and operating the uranium enrichment enterprise. DOE retains responsibility for the non-leased portions of the site, which consist primarily of environmental restoration and waste management activities.

3.2.1 Public and Worker Risk

The radiation dose from airborne radionuclides to a maximally exposed individual was 0.260 mrem, and the collective radiological dose from airborne emissions to the site ROI health risk population was 3.0 person-rem (DOE 1997b).

3.2.2 Climate and Air Quality

Prevailing winds at Portsmouth are from the south to southwest, with the south averaging the highest at just over 11% of the time. Wind speeds average 5 mph, with winds up to 75 mph on record. The average annual temperature measured at the site in 1992 was 55°F with seasonal average temperatures of 32°F in the winter and 90°F in the summer (DOE 1997b).

Pike County is classified by the U.S. Environmental Protection Agency (EPA) as an attainment area for all six National Ambient Air Quality Standards (NAAQS) criteria air pollutants. The major sources of criteria pollutant emissions are three coal-fired boilers at the X-600 steam plant. Sources of radionuclide and fluoride emissions include purge cascade vents, cold recovery and wet evacuation vents, the X-344 evacuation vent, and six seal exhaust vents.

3.2.3 Water Resources

Surface Water

Major surface water features include the Scioto River and its on-site tributaries—Little Beaver Creek and Big Run Creek. There are no federally designated Wild and Scenic Rivers in the ROI. Both the Scioto River and an alluvial aquifer supply water to the site, and the on-site streams and Scioto River receive treated wastewater. The site is located outside the 500-year floodplain.

Groundwater

Major groundwater units include the Mississippian shale and sandstone bedrock aquifer and the unconsolidated sediment aquifer.

3.2.4 Geology and Soils

The site is on gently rolling land about 130 ft above the Scioto River and 670 ft above sea level. The predominant landform in the area is a relatively level, filled valley of the preglacial Portsmouth River, which runs north to south. Major rock units include, from oldest to youngest, the Ohio Shale, the Bedford Shale, the Berea Sandstone, the Sunbury Shale, and the Cuyahoga Shale. The site is in an abandoned river valley filled with fluvial materials. The soils in the fenced area are mostly urban land covered by roads, parking lots,

buildings, and railroads. Other soils are well-drained upland soils. No significant geologic faults exist in the ROI, and the potential for volcanic activity is small.

3.2.5 Ecological Resources

Vegetation consists of pastureland, old fields, oak-hickory, upland mixed hardwood, bottomland mixed hardwood, pine, second-growth hardwood, and scrub thicket. All forests and old fields are second growth. There is one acre of wetlands at the site. The federally protected, endangered Indiana Bat has been identified in the vicinity of the site, but no threatened or endangered species have been located onsite. Several statelisted species are known for the vicinity but none onsite.

3.2.6 Socioeconomics and Environmental Justice

Socioeconomics

The Portsmouth ROI includes both Pike County, where the facility is located, and Scioto County, which includes Portsmouth, the nearest city. Table 3.2 summarizes population, per capita income, and wage and salary employment for both counties from 1991 to 1996, the last year for which figures were available. Combined wage and salary employment for the region was nearly 38,000 in 1996; total personal income was \$1.7 billion (U.S. Bureau of Economic Analysis 1998). Total site employment in 1990 was 2386.

Table 3.2. Population, Income, and Employment in the Portsmouth Region of Influence for Pike County and Scioto County

Region/Variable	1001	1002	1002	1004	1005	1006	Growth
Region/ v arrable	1991	1992	1993	1994	1995	1996	1991-96
Pike County							
Population	24,656	25,233	25,654	26,052	26,757	27,088	1.90%
Per Capita Pers. Inc. (\$)	12,469	13,323	13,937	14,543	14,751	15,462	4.40%
Total Personal Income (Mil.\$)	307	336	358	379	395	419	6.42%
Wage & Salary Employment	8,286	8,625	9,215	9,887	10,834	11,386	6.56%
Scioto County							
Population	80,156	80,874	80,617	80,918	81,123	80,947	0.20%
Per Capita Pers. Inc. (\$)	12,841	13,451	14,082	14,716	15,516	16,313	4.90%
Total Personal Income (Mil.\$)	1,029	1,088	1,135	1,191	1,259	1,320	5.11%
Wage & Salary Employment	22,790	23,282	24,356	25,027	26,007	26,421	3.00%
Region Total							
Population	104,812	106,107	106,271	106,970	107,880	108,035	0.61%
Per Capita Pers. Inc. (\$)	12,747	13,420	14,049	14,677	15,332	16,097	4.78%
Total Personal Income (Mil.\$)	1,336	1,424	1,493	1,570	1,654	1,739	5.41%
Wage & Salary Employment	31,076	31,907	33,571	34,914	36,841	37,807	4.00%

Environmental Justice

There are no federally recognized Native American tribes in the ROI. There are no minority populations within a 20-mile radius of the PORTS site. However, the vast majority of a 20-mile radius of the plant has low-income populations (based on population proportions greater than the national average of 13.1%).

3.2.7 Land Use

The site covers approximately 6.3 square miles (4003 acres), of which 800 acres are developed and 3203 acres are undeveloped. Of the land that is undeveloped, nearly all is available for future site development. Land use surrounding the site is predominantly rural.

3.2.8 Infrastructure

An on-site facility and 31 off-site wells provide an average of 14 million gallons of water per day. An on-site facility receives an average of 0.35 million gallons of sewage per day. The Ohio Electric Corporation supplies power via an electrical and coal-fired system; the current load is 1537 megawatts of electricity and 4500 tons of coal per month. Transportation in the region consists of local access roads (such as Piketon Hill Road and State Route 32) and major roads (such as Interstate 70 and U.S. Highways 23, 52, and 50). The Chesapeake and Ohio Railroad and the Norfolk and Western Railroad are the primary providers of rail service to the Portsmouth region.

3.2.9 Cultural Resources

The site has no recorded archaeological sites, standing structures, or traditional cultural properties, except for two cemeteries in the northwest corner of the site. A cultural resources study was conducted for the site in 1997. The study addressed the site facilities and surrounding lands and included archaeological and historical aspects of the site.

3.3 PADUCAH GASEOUS DIFFUSION PLANT

The PGDP Reservation covers 3425 acres in western Kentucky, 10 miles west of Paducah, and employs 1868 people. Paducah has been an active uranium enrichment facility since 1952. Enriched uranium is produced by the United States Enrichment Corporation for the commercial sector as fuel for nuclear power reactors in the United States and overseas. PGDP is a feed facility for Portsmouth.

3.3.1 Public and Worker Risk

The radiation dose from airborne radionuclides to the maximally exposed individual was 0.0045 mrem, and the collective dose from radionuclide emissions to the site ROI health risk population was 0.017 person-rem. The ROI population was estimated at 500,502 based on 1990 census data.

3.3.2 Climate and Air Quality

Prevailing winds at the Paducah Airport in 1992 were from the south 16% of the time on a yearly basis. The highest occurrence of wind speed was from 8 to 11 mph with an annual occurrence of 31%. January is the coldest month, with a daily average temperature of 35°F, while July is the warmest month with an average temperature of 79°F.

McCracken County is classified by the EPA as a marginal attainment area for ozone. The county is in attainment for the other criteria pollutants. The major sources of criteria air pollutant emissions are coal, oil-, and gas-fired boilers. Sources of radionuclide emissions in 1997 were the cascade purge vent/stack at the C-310 purge and products building, decontamination activities at the C-400 cleaning building, and emissions from laboratory hoods in the C-710 building.

3.3.3 Water Resources

Surface Water

Major surface water features include the Ohio River, which is less than 2 miles from Paducah; Metropolis Lake (1.5 miles northeast); and two small tributaries to the Ohio River (Big Bayou Creek and Little Bayou Creek) that provide surface drainage to the site. There are no federally designated Wild and Scenic Rivers in the ROI. The site is above the probable 500-year flood level. The site receives fresh water from the Ohio River, and both the two onsite streams and the Ohio River receive treated wastewater from the site.

Groundwater

Major groundwater units include, from bottom to top, the McNairy Flow System (interbedded sand, silt and clay); the terrace gravels; the Regional Gravel Aquifer (the primary aquifer in the area, composed of sand and gravel units); and the Upper Continental Recharge System (clayey silt with interbedded sand and gravel). No aquifers are considered sole-source aquifers. Two major plumes of groundwater contamination extend offsite.

3.3.4 Geology and Soils

The topography slopes slightly from more than 450 ft in the southern part of the site to near 300 ft near the Ohio River. Surface sediments consist of valley fill deposits, which underlie most of the site, extending northward to the Ohio River. Major rock units include, from oldest to youngest, basement rocks; Tuscaloosa Formation basal gravels; the McNairy Formation; the Porters Creek Clay; continental deposits of gravel and clay-sand units; and a 10- to 30-ft layer of loess (windblown sediment). Soils beneath the site are nearly level and somewhat poorly drained. Geologic hazards include the potential for earthquakes. The site is near two active seismic zones, the New Madrid Fault Zone and the Wabash Valley Fault Zone. The potential for volcanic activity is small.

3.3.5 Ecological Resources

Nonforested areas consisting of mowed grass and developed area cover most of the Paducah site; forested areas are small and dominated by mature hardwood upland and riparian forests. On-site wetlands consist of forested wetlands (mature riparian hardwood forest). A wetland in the West Kentucky Wildlife Management Area (the buffer area surrounding the production facilities) has been designated an area of ecological concern.

Federally listed endangered species that have been identified, or could be identified, in the vicinity of the Paducah site include the Indiana Bat, the Interior Least Tern, and four species of pearly mussels. Another species of pearly mussel is federally listed as threatened, as are the bald eagle and Evening Bat. No federally listed plant species are known to occur in the vicinity of Paducah.

3.3.6 Socioeconomics and Environmental Justice

Socioeconomics

The Paducah ROI includes McCracken County, Kentucky, where the facility is located. Table 3.3 summarizes population, per capita income, and wage and salary employment from 1991 to 1996. Wage and

3

salary employment for the region was over 39,000 in 1996; total personal income was \$1.5 billion. Total site employment in 1990 was 1,740.

Table 3.3. Population, Income, and Employment in the PGDP Region of Influence for McCracken County

Region/Variable	1991	1992	1993	1994	1995	1996	Growth 1991-96
Kentucky							
McCracken County							
Population	63,237	63,729	64,171	64,646	64,600	64,701	0.46%
Per Capita Pers. Inc. (\$)	18,352	19,311	20,089	20,689	22,437	23,567	5.13%
Total Personal Income (Mil \$)	1,161	1,231	1,289	1,337	1,449	1,525	5.61%
Wage & Salary Employment	33,959	34,746	36,713	37,391	38,639	39,392	3.01%

Environmental Justice

There are both low-income and minority populations near the plant site with minority populations in the City of Paducah. There are no federally recognized Native American tribes in the area.

3.3.7 Land Use

The site occupies approximately 3425 acres, of which 750 acres are developed and 2675 acres are undeveloped. Land use surrounding the site is predominantly undeveloped natural area.

3.3.8 Infrastructure

The Ohio River supplies an average of 15 million gallons of water per day; the water is treated onsite by chemical and physical processes. An on-site treatment plant receives an average of 0.2 to 0.4 million gallons of sewage per day. Sewage is treated on site. Electric Energy, Inc., supplies power; the current site load is 1564 MW. The site also uses approximately 82 tons of coal per day. Transportation in the region consists of local access roads (State Routes 1154 and 358) and major roads (Interstate 24 and U.S. Highways 45, 60, and 63). The Burlington Northern Railroad, Paducah Railroad, Louisville, and the on-site U.S. Government Railroad are primary providers of rail service to the Paducah region.

3.3.9 Cultural Resources

The site has three recorded archaeological or historic sites, and others have been identified in areas near the Paducah plant site. The site has not been subject to any systematic cultural resources surveys.

3.4 Y-12 PLANT

Until 1992 the primary mission of the Y-12 Plant was the production and fabrication of nuclear weapons components. Current assignments in the Y-12 Defense Programs include dismantling nuclear weapons components returned from the national arsenal, serving as the nation's storehouse of special nuclear materials, and providing special production support to DOE programs (ORNL 1998).

3.4.1 Public and Worker Risk

The calculated radiation doses to maximally exposed off-site individuals from airborne releases in 1997 was 0.33 mrem (ORNL 1998). The collective radiological dose from airborne radionuclide emissions to the site ROI health risk population was 43 person-rem (DOE 1997b).

3.4.2 Climate and Air Quality

The climate of eastern Tennessee may be broadly classified as humid continental, although it is very near the region of temperate continental climate to the north. The Cumberland Mountains/Plateau to the northwest and the Great Smoky Mountains to the southeast influence the patterns of temperature and precipitation over the region, with cooler temperatures and greater precipitation generally occurring at the higher elevations. The average annual temperature in Oak Ridge, based on a 30-year period from 1961 to 1990, is 56.6°F and precipitation is 53.8 in. per year. Precipitation is fairly evenly distributed most of the year. The average wind speed is approximately 4 mph (at 10 m above the ground), and the highest wind speed, 79 mph, was associated with a tornado in Bear Creek Valley during the afternoon of February 21, 1993. Prevailing wind directions are from the northeast and southwest, reflecting the channeling of winds parallel to the ridges and valleys in the area.

Roane County and all surrounding counties are in attainment for NAAQS criteria pollutants. The nearest nonattainment area is Polk County, which is about 40 miles south of the Y-12 Plant. Air quality in the region is generally good. The ozone standard is occasionally exceeded in Knoxville; however, Knox County is in attainment of the ozone standard.

The release of radiological contaminants, primarily uranium, into the atmosphere at the Y-12 Plant occurs almost exclusively as a result of plant production, maintenance, and waste management activities. In 1997, only 0.013 curies of uranium were released from Y-12. However, ORNL releases are much larger with over 10,000 curies from the High Flux Isotope Reactor in 1997 (ORNL 1998). Measurements at the perimeter of the Oak Ridge Reservation (ORR) indicate ambient air concentrations are less than 1% of their respective derived concentration guides (DCGs) given in DOE Order 5400.5 (DOE 1997a). A DCG is a concentration of a given radionuclide for one exposure pathway (e.g., inhalation) that would result in an effective close equivalent of 100 mrem per year to reference man, as defined by the International Commission on Radiological Protection.

The nearest prevention of significant deterioration (PSD) Class I area to the Y-12 Plant is the Great Smoky Mountains National Park approximately 30 miles south of the Y-12 Plant. The Joyce Kilmer Wilderness Area, which is also a Class I area, is just south of the western end of the Great Smoky Mountains National Park. The median visibility range at the park is 24 miles with a summer median of 12 miles.

3.4.3 Water Resources

The Y-12 Plant is approximately 2 miles from the Melton Hill Reservoir and Clinch River. Onsite, two streams originate approximately in the middle of the plant. Bear Creek flows directly west from its headwaters at the Y-12 Plant; East Fork Poplar Creek flows east before turning north and west and flowing through the city of Oak Ridge. These two creeks merge near the ETTP, which is approximately 10 miles west of the Y-12 Plant. The major groundwater unit for the ORR is the Knox Aquifer, composed of the Knox Group and the Maynardville Limestone. No aquifers are considered sole-source aquifers (DOE 1997b).

3.4.4 Geology and Soils

On a regional scale, the ORR, which includes the Y-12 Plant, is located on the western part of the Valley and Ridge Province (DOE 1998). The stratigraphic section of the ORR is stacked along three major thrust faults. The eastern portion of the Y-12 Plant is located on the White Mountain thrust sheet. This fault has not been historically active (DOE 1998).

Bear Creek Valley, to the west, is underlain by rocks of three regionally important stratigraphic units: the Rome Formation, the Conasauga Formation, and the Knox Group that typically dip 45° to the southeast (DOE 1997). The geology of Bear Creek Valley displays an inclined layer cake-style stratigraphy that is observed on a variety of scales: on a regional scale where limestone- and dolomite-dominated rock groups are interbedded with predominantly clastic shale groups, and on the scale of outcrops where clastic beds are interlayered with carbonate beds. This layered structure exerts a strong influence on groundwater flow (DOE 1997).

3.4.5 Ecological Resources

The ORR consists of diverse habitats and supports a rich variety of flora and fauna. Vegetation is characteristic of that found in the intermountain regions of central and southern Appalachia. The Y-12 Plant site is covered in mowed grass, concrete, gravel, asphalt, and industrial structures. Thus, the site does not have unique habitats or a wide diversity of flora or fauna. Upper East Fork Poplar Creek lacks riparian vegetation because much of the stream is channelized and maintained. Lake Reality is a 2.5-acre, plastic-lined, flat-bottomed settling and spill control structure located near the east end of the plant on East Fork Poplar Creek.

There are no federally protected threatened or endangered species known on the Y-12 Plant site. Although surveys for protected species are not comprehensive enough to rule out all possible federal- or state-listed vertebrates, the likelihood of finding such species seems very low (DOE 1998).

There is a small wetland (0.45 acres) in a small wooded area between New Hope Cemetery and Bear Creek Road.

3.4.6 Socioeconomics and Environmental Justice

The Y-12 Plant is one of three sites located on the DOE ORR, which includes portions of both Anderson and Roane counties in Tennessee. This region also includes the city of Oak Ridge, which provides a substantial portion of the work force for the three facilities. To generate the most conservative estimates of potential impact, the ROI includes only these two counties. Actual impacts are likely to be distributed over a wider area, since Anderson County is also part of the MSA for the much larger city of Knoxville and draws commuters from at least 12 counties in eastern Tennessee.\footnote{1}

Table 3.4 summarizes population, per capita income, and wage and salary employment from 1991 to 1996. Wage and salary employment for the region was over 64,000 in 1996; total personal income was over \$2.5 billion. The Scarboro Community, which borders the fence line of the plant's northern boundary, is predominantly an African-American Community.

^tCommuting data taken from Oak Ridge Chamber of Commerce website, www.orcc.org/labor.html.

3.4.7 Land Use

Land use within 50 miles of the Y-12 Plant is primarily agricultural except for the city of Knoxville and the city of Oak Ridge (DOE 1994). The Y-12 Plant is an industrial site that has been in operation since World War II. The city of Oak Ridge forms much of the northern boundary to the site, and the Tennessee Valley Authority's (TVA's) Melton Hill Reservoir and the Clinch River form the eastern and southern boundaries. Recreational uses of the surrounding area include fishing, boating, hunting, and camping. Several recreational areas are within 5 miles of the site.

Table 3.4. Population, Income, and Employment in the Y-12 Plant Region of Influence for Anderson County and Roane County

Region/Variable	1991	1992	1993	1994	1995	1996	Growth 1991-96
Tennessee							1//1/
Anderson County							
Population	69,208	70,361	70,648	70,878	71,292	71,479	0.650/
Per Capita Pers. Inc. (\$)	18,040	19,101	20,092	20,690	21,715	22,292	0.65%
Total Personal Income (Mil \$)	1,249	1,344	1,419	1,466	1,548	1,593	4.32% 4.99%
Wage & Salary Employment	37,395	39,102	41,296	40,698	42,922	41,010	1.86%
Roane County							
Population	47,639	47,880	47,985	48,763	48,986	49,673	0.84%
Per Capita Pers. Inc. (\$)	15,551	16,705	17,740	18,158	19,070	19,601	4.74%
Total Personal Income (Mil \$)	741	800	851	885	934	974	5.62%
Wage & Salary Employment	21,305	22,186	23,055	24,235	23,550	23,633	2.10%

3.4.8 Infrastructure

Sanitary wastewater from the Y-12 Plant is discharged to the City of Oak Ridge publicly owned treatment works under an industrial and commercial wastewater discharge permit. Sanitary sewer radiological sample results at the Y-12 Plant are routinely reviewed to determine compliance with DOE Order 500.5 "Radiological Protection of the Public and the Environment." No radiological parameter that is monitored (including uranium) has exceeded a DCG (ORNL 1998). Typically, sample results indicate the Y-12 Plant radiological discharges are three orders of magnitude below their respective DCG (ORNL 1998).

3.4.9 Cultural Resources

Native American occupation of the Oak Ridge area began about 12,000 years ago. European settlement began in the Eighteenth Century. Much of the current Y-12 Plant site was farmed before World War II when the site was secured by the federal government as part of the Manhattan Project. A recent draft Cultural Resources Survey identified an historic district with 93 contributing buildings that is eligible for inclusion in the National Register of Historic Places.

3.5 EAST TENNESSEE TECHNOLOGY PARK

ETTP, formerly known as the ORGDP or K-25 Site, is located in Roane County, Tennessee, and is one of three large facilities comprising the ORR. The site is located on a level 1500-acre tract of land near the

confluence of Poplar Creek and the Clinch River. ETTP is approximately 35 miles west of Knoxville and approximately 8 miles southwest of the city of Oak Ridge.

3.5.1 Public and Worker Risk

The calculated radiation doses to maximally exposed off-site individuals from airborne releases in 1997 was 0.59 mrem (ORNL 1998). The collective radiological dose from airborne radionuclide emissions to the site ROI health risk population was 43 person-rem (DOE 1997b).

3.5.2 Climate and Air Quality

The climate of eastern Tennessee may be broadly classified as humid continental, although it is very near the region of temperate continental climate to the north. The Cumberland Mountains/Plateau to the northwest and the Great Smoky Mountains to the southeast influence the patterns of temperature and precipitation over the region, with cooler temperatures and greater precipitation generally occurring at the higher elevations. The average annual temperature in Oak Ridge, based on a 30-year period from 1961 to 1990, is 56.6°F and precipitation is 53.8 in. per year. Precipitation is fairly evenly distributed most of the year. The average wind speed is approximately 4 mph (at 10 m above the ground) and the highest wind speed, 79 mph, was associated with a tornado in Bear Creek Valley during the afternoon of February 21, 1993. Prevailing wind directions are from the northeast and southwest, reflecting the channeling of winds parallel to the ridges and valleys in the area.

Roane County and all surrounding counties are in attainment for NAAQS criteria pollutants. The nearest nonattainment area is in Polk County, which about 45 miles south of ETTP. Air quality in the region is generally good. The ozone standard is occasionally exceeded in Knoxville; however, Knox County is in attainment of the ozone standard.

For radiological pollutants, emissions are variable and emanate mostly from the TSCA incinerator. Measurements at the perimeter of the ORR indicate ambient air concentrations are less than 1% of their respective DCGs given in DOE Order 5400.5 (DOE 1997a).

The nearest PSD Class I area to ETTP is the Great Smoky Mountains National Park, 35 miles south of ETTP. The Joyce Kilmer Wilderness Area, which is also a Class I area, is just south of the western end of the Great Smoky Mountains National Park. The median visibility range at the park is 24 miles with a summer median of 12 miles.

3.5.3 Water Resources

Surface Water

ETTP is directly adjacent to the Clinch River along the northwest boundary of the ORR. Poplar Creek is a moderately wide (30- to 70-ft) stream that enters the north side of ETTP about 0.3 miles downstream of the confluence of the east and west forks of Poplar Creek. The lower reach of Poplar Creek meanders sharply along the southwest side of the ETTP and enters the Clinch River.

TVA performed an analysis of floods on the Clinch River and Poplar Creek. TVA concluded that most of ETTP is above the probable maximum flood level. The only facilities identified at risk during major floods were the K-25 power plant and the pumping station for ETTP's water filtration plant. The source of flooding at ETTP would be backwater from the Clinch River near the confluence of Poplar Creek. All proposed storage locations are above the 100-year flood level.

Groundwater

Groundwater occurs at ETTP in both the unconsolidated overburden and underlying bedrock as a single, unconfined water table aquifer. With few exceptions the water table occurs in the overburden overlying bedrock with the saturated overburden ranging up to 70 ft. In general, the water table is encountered within several feet of the surface adjacent to major water features and in incised ravines.

Groundwater flows in bedrock are controlled by hydraulic gradients, fracture networks, and karst solution features. Typically, bedrock flowpaths tend to follow geologic strike. Karst features are present in bedrock at ETTP, but conduit-dominated flow has been confirmed only in portions underlain by Knox carbonate along Black Oak Ridge.

The nearest domestic water supply wells are located approximately 2 miles southwest of ETTP on the opposite side of the Clinch River. It is unlikely that these wells could be affected by groundwater flowpaths from ETTP, should such a pathway exist. Additionally, there are nearly a dozen domestic wells along Black Oak Ridge, west of the DOE boundary. Four of these wells were sampled recently and found to be uncontaminated.

3.5.4 Geology and Soils

In general, ETTP is underlain by bedrock that can be broadly characterized as carbonate (Chickamauga and Knox Group) or clastic (Rome Formation). The carbonates underlie the majority of the main plant area. The eastern part of the site is underlain by clastic bedrock of the Cambrian Rome Formation. The structural geology of the ETTP is complex; the principal faults in the area include the White Oak Fault, a major regional thrust fault located along the south side of the ETTP. Seismic activity in the southern Appalachian Mountains that has affected the site area has been recorded 45 times since 1800. The probability of future seismic damage is moderate.

3.5.5 Ecological Resources

The ORR consists of diverse habitats and supports a rich variety of flora and fauna. Vegetation is characteristic of that found in the intermountain regions of central and southern Appalachia. Vegetation around the buildings within the fenced area on the ETTP proper is a mixture of mowed grasses with a few shrubs and trees. Many of the shrubs and trees have been planted as landscaping, although some native species are found in unmowed areas around ponds and waterways.

Since ETTP proper is primarily planted in non-native grasses, it has very little habitat available for native animals except along Poplar Creek. The majority of animal species found within ETTP's boundaries are species that adapt well to disturbance and the presence of humans. There are no known federally protected plant or animal species on the ETTP site, although suitable habitat exists for the endangered bald eagle on Melton Hill Reservoir and the Clinch River. Sixteen plant species and 18 animal species that are considered rare, threatened, or endangered by the State of Tennessee are found on or near ETTP.

The Lower Poplar Creek Rookery is the only environmentally sensitive area within ETTP. It is approximately 6.5 acres in size and is located on the north bank of Poplar Creek in the middle of the plant site.

3.5.6 Socioeconomics and Environmental Justice

Like the Y-12 Plant, ETTP is located on the DOE ORR, and the region of impact is identical to the ROI for the Y-12 Plant alternative. See Sect. 3.4.6 for summaries of population, income, and employment within the region. ETTP is in proximity to low-income populations on Blair Road (which runs behind the Park).

3.5.7 Land Use

The approximately 1500 acres of land in the ETTP site are industrial. The site formerly produced enriched uranium using a gaseous diffusion process. Portions of the site have been used for waste storage since the facility ceased enrichment operations. Efforts are under way to convert existing buildings into productive use through reindustrialization.

3.5.8 Infrastructure

Treatment of domestic wastewater is performed at the ETTP Sewage Treatment Plant which is operating within its National Pollutant Discharge Elimination System permit. The operating capacity of the treatment plant is about 600,000 gallons per day (gpd) with a current load of half that capacity (DOE 1997a). The ETTP water treatment plant is currently producing 800,000 gpd to 1.4 Mgd of potable water. Capacity of the system is roughly three times the current use. Highways in the area of the site include State Routes 95 and 58.

3.5.9 Cultural Resources

The K-25 Site was established as part of the Manhattan Project to develop and produce highly enriched uranium nuclear fuel for the atomic bomb used in World War II. The Manhattan Project was the first industrial process for separating the uranium isotopes by the gaseous diffusion method. A summer 1994 cultural resources survey of the former K-25 Site identified a "Main Plant Historic District," with 120 "contributing" buildings, that is eligible for inclusion on the National Register of Historic Places.

4. ENVIRONMENTAL CONSEQUENCES

At all sites the environmental impacts associated with minimal construction and operations, including risks associated with receipt and offloading of uranium materials and normal operations, are minimal and negligible. Postulated accident scenarios at all the DOE sites and buildings/areas within DOE sites result in low to negligible potential risk. Buildings or areas located relatively close to the facility boundaries (e.g., K-1066F Area at ETTP) have the highest potential for adverse consequences (but still low risk) under certain hypothetical accident scenarios.

The first part of this chapter (Sect. 4.1) establishes the methodology used to calculate public and worker risk under both routine operations and under various accident scenarios. The uranium source term, the assumed accident frequencies, and other parameters needed to model the accident scenarios will be defined in Appendix C. The detailed results of the modeling will be presented in tables showing all storage alternatives under all the hypothetical accident scenarios. The second part of this chapter (Sects. 4.2 through 4.6) summarizes the environmental consequences at each of the five alternative storage sites [No Action (FEMP), PORTS, PGDP, Y-12 Plant, and ETTP].

4.1 PUBLIC AND WORKER RISK

This section describes risk to the public, co-located worker, and facility worker due to continued storage of uranium materials at the FEMP site, or receipt and storage of these materials at other DOE-ORO sites described in Sect. 2. Risks are evaluated for routine operations and non-routine (accident) conditions. Offsite releases were determined to be minor at all sites.

The number of parameters that could affect the off-site human health and environmental consequences of a catastrophic release are vast. For example, the assumptions regarding wind speed, wind direction, height of plume, the amount of uranium affected, the amount of dilution, and the area of deposition could vary in some cases by orders of magnitude. Because of the complexity involved with multiple varying assumptions, worst-case assumptions for off-site transport and human health dose at each potential storage location are employed according to the following rationale.

For assessment of environmental consequences, the worst-case accident is assumed to be a seismic event and resulting fire which breaches much of the primary and secondary containment and results in a plume that entrains a large portion of the uranium source material. It is further assumed that the plume moves directly via the shortest distance from the storage locations to a potential receptor at the facility boundary, and that all of the uranium in the plume is respirable. However unlikely this scenario is, given fire alarm and suppression capabilities, it is still assumed that a resulting plume from a seismic event and fire would be the most likely worst-case accident to get the highest concentration of source material to the nearest off-site receptor (i.e., compared to a tornado or aircraft impact). This is especially true given the form of the majority of the uranium (e.g., ingots, recyclable pieces of metal.) While a tornado might lift a large majority of the source term and drop it in off-site areas, the material would not exist in a respirable fraction. The hypothetical seismic/fire scenario also results in the worst-case exposure pathway (inhalation), since uranium is predominately an alpha-particle emitter. This will be addressed in greater detail in Appendix C.

Uranium that is released from primary and secondary containment under the accident scenario described above and modeled later in this section can be deposited on surface soils and be subject to movement with soil water through the vadose zone into groundwater. The material could also be deposited directly into water

bodies or move from the surface soil overland into water bodies. As described below, any exposure pathway to human receptors via soil, groundwater, or surface water would be relatively unimportant compared to the inhalation pathway to the nearest off-site receptor.

Upon deposition of the uranium entrained in the plume, the fate and transport of uranium is a function of the environmental site characteristics and the physical/chemical properties of uranium. Such properties include uranium's solubility in water, the tendency of uranium to transform or degrade (e.g., 238 U has a half-life of 4.5 billion years), and chemical affinity for solids or organic matter (described as a partitioning coefficient K_d). An average K_d value for uranium is 15 L/kg, although the possible range of K_d s can vary widely (Sheppard and Thibault 1990). Contaminants with small K_d s will be leached more effectively into the groundwater (i.e., be more mobile) than those with larger K_d s. For example, uranium is much less mobile than 99 Tc, which has a K_d of 0.1 L/kg.

In addition, uranium can be transformed to other oxidation states in soil, further reducing its mobility. If organic matter, clay, and hydrous oxides are present in the receiving soils, adsorption of the uranium metal may occur onto these materials, also reducing the uranium's mobility and toxicity. The soils described in Sect. 3 are generally clay- and organic-matter rich and would be effective in retarding the mobility of uranium. Further, even if resuspended and available to an off-site receptor via inhalation, uranium concentrations would be diluted compared to the concentrations available in the original plume.

Each of the potential storage locations described in Sect. 3 is located within water-rich environments (i.e., each site is near major rivers). Therefore, even though the previous section supports minimal mobility of uranium in the soil, upon any accidental release, a fraction of the uranium could enter the water system, especially by direct deposition from the plume. The mobility of uranium deposited onto water depends upon the type of complex (cationic or anionic) formed as a result of the physical processes acting on the uranium. Cationic species tend to adsorb to soil, and anionic species tend to move with water. Uranium released in a fire would be oxidized (be cationic) and would tend to adsorb to the soil particles entrained in the water. As with uranium deposited upon the soil, the doses to a receptor in contact with uranium in water or associated sediment would be less significant than those of the receptor exposed to the initial plume.

Once in the off-site environment, the source material is assumed to intercept a human receptor. In general, uranium compounds are not easily absorbed across the gastrointestinal tract. Soluble uranium compounds demonstrate the best absorption, but this absorption is still low. Uranium is known to be a chemical toxicant, exposure to which leads to nephritis in the kidney. Uranium can also induce cancer when organs and tissues are exposed to alpha particles emitted from decaying uranium atoms. While other energetic emissions from radioactive decay of atoms, such as beta particles and gamma rays, also cause molecular ionization, these radiations do not produce the density of ionizations that alpha particles do when inside the human body. The ionization events cause biological damage, which is believed to be responsible for inducing cells to become cancerous. The types of uranium (e.g., natural, enriched, and depleted) under consideration are important because different types of uranium have different specific activities (the amount of radioactivity per unit mass). The difference between natural, enriched, and depleted uranium is defined by the percent ²³⁵U mass enrichment. The higher the ²³⁵U enrichment, the higher the specific activity of the mixture. The different quantities of source material and their associated activities are considered in the quantitative assessment that follows.

In summary, the potential adverse effects of the uranium source material in environmental media such as groundwater, surface water, soil, or sediment are relatively unimportant when compared to a release of the source material into the air from various accident scenarios. Therefore, the quantitative assessment

provided in this section will address the inhalation exposure pathway and the resulting calculated dose from both routine operations and various accident scenarios.

4.2 NO ACTION ALTERNATIVE

Under this alternative, the uranium currently stored at the FEMP site would remain at the site. The uranium is currently in various container types including 55-gallon steel drums, T-hoppers, half-high boxes, and sea-land containers. Currently, the nuclear material is located in Buildings 4B, 77, and 54B but would be moved to TS-4 and TS-5 at Plant Pad 1 and would be located under two existing TSSs (see Fig. 2.1).

4.2.1 Normal Operations

Under normal operations, land use, geology and soils, water resources, cultural resources, and the infrastructure would remain unchanged. Air effluents associated with uranium inventory maintenance would be minimal and would remain the same as present. Since there is no new construction and there are no effluents from the stored uranium, plant and animal species would not be adversely affected and cultural resources would not be impacted. Some continued maintenance of these buildings would be required, and monitoring and surveillance by FEMP site personnel would continue. The socioeconomic impact analysis assumes little or no construction activity and that the employees currently monitoring the uranium will continue to do so. Under these assumptions, there is no change in expenditures or employment and, consequently, no impact. Even if three additional workers were hired for monitoring, they would represent a minimal increase to the more than 590,000 existing wage and salary workers in Hamilton County. In the absence of important impacts, environmental justice concerns do not arise.

During storage of uranium materials, workers could be exposed to direct radiation from surface contamination on the storage containers. However, the containers have been checked and overpacked if deemed necessary. Therefore, worker exposure due to routine operations associated with surveillance and maintenance of stored materials is expected to be less than detectable levels.

In addition to surface contamination, a radiation dose from the stored uranium materials can be expected. Dose rates from any single stored container are no more than 3 to 4 mrem/h. The dose rate at a distance of 1 ft from a container is ~1 mrem/h, and the dose rate at a distance of 20 ft is <0.5 mrem/h (approximately the same as normal background radiation doses). These dose rates are not affected by stacking the containers because the containers and the materials themselves provide significant shielding. These dose rates are considered negligible to any receptor (facility worker, co-located worker, or public).

4.2.2 Accidents

The accident risk calculated for the baseline condition would not change. Various accident scenarios are calculated for both the public and the co-located worker at the DOE sites, including the FEMP site. Doses to the facility worker, co-located worker, and the public associated with general handling accidents, storage area fires, and seismic events are summarized in Table C.8 in Appendix C. The highest radiological risk to the public (0.63 rem dose) is from a storage area fire and to the co-located worker (0.84 rem) is from an earthquake with aerial dispersion of uranium materials. Average annual exposure to natural sources is approximately 0.29 rem. Since the uranium materials would continue to remain at the FEMP site, there is no change in these exposures or risks. These risks would continue to exist for the public and the workers. These exposures constitute a low risk and are environmentally negligible.

4.3 PORTSMOUTH GASEOUS DIFFUSION PLANT

The proposed action is to place up to 3800 MTU of nuclear materials product currently stored at the FEMP site to another DOE-ORO site. PORTS qualifies as such a site and has a long history of handling uranium and other nuclear products.

4.3.1 Normal Operations

Under normal operations, land use, cultural resources, and infrastructure would remain unchanged. Construction would be involved only at the X-7745R Storage Yard for two TSSs and receiving docks at the lithium buildings, and possibly Building X-744K. Construction would occur within the existing plant boundary in an industrial area. The receiving docks would be immediately adjacent to existing buildings, and each would be 30 by 40 ft in size. The amount of land disturbance would result in minor impacts to soils or biota. In those areas where some existing grass and open area exists, this permanent conversion is less than 0.3 acre and would be inconsequential. The area required for the TSSs at X-7745R Storage Yard would be slightly over 1 acre; however, the area is already covered by a concrete pad and no additional impacts to soils, air quality, or biota are expected. Building X-744K is approximately 200 ft from Big Run Creek and 800 ft from a holding pond associated with Big Run Creek.

Under normal operations no impacts to the water quality or aquatic biota in this holding pond or Big Run Creek are expected. Should a receiving dock be required for this building, it would be constructed on the opposite side of the building from Big Run Creek, and standard best management practices (BMPs) will be followed to ensure that construction-related runoff is controlled. No increase in turbidity in Big Run Creek or the holding pond is expected.

The socioeconomic impact analysis assumes a maximum of \$5 million in construction expenditures to be spent in the current fiscal year for a combination of building upgrades and TSS construction. Up to three full-time equivalent (FTE) jobs would be required to operate the facility. If one assumes that all of the construction funds are spent on labor, and that the three new facility employees earn the average per capita income for the ROI, the impact on income in the first year would be \$5.05 million, or 0.3% of the ROI 1996 baseline. This represents a conservative upper bound, since some of the construction investment will represent materials purchases rather than labor, and actual construction expenditures may be smaller. After the first year, the impact on income would be limited to the salaries of the three employees, an even smaller fraction of the local economic base.

Based on this analysis, the proposed action would be inconsequential. In the absence of any important impacts, including effluent releases, environmental justice issues do not arise.

The impact on employment and population is similarly small. If one assumes that the construction workers each earn the average per capita income, the initial \$5 million expenditure implies roughly 310 construction jobs in the first year, and three full-time workers to operate the facility. The first-year impact then represents 0.8% of the wage and salary workers shown in Table 3.2. For subsequent years, the impact of three full-time jobs in this region is negligible. If the new employees moved into the region with their families, the impact on the population base would be even smaller than the employment impact.

During storage of uranium materials, workers could be exposed to direct radiation from surface contamination on the storage containers. However, the containers have been checked, overpacked if deemed necessary, and certified for transport before storage. Therefore, worker exposure due to routine operations associated with surveillance and maintenance of stored materials is expected to be less than detectable levels.

In addition to surface contamination, radiation doses from the stored uranium materials can be expected. Dose rates from any single stored container are no more than 3 to 4 mrem/h. The dose rate at a distance of 1 ft from a container is ~1 mrem/h, and the dose rate at a distance of 20 ft is <0.5 mrem/h (approximately the same as normal background radiation doses). These dose rates are not affected by stacking the containers because the containers and the materials themselves provide significant shielding. These dose rates are considered negligible to any receptor (facility worker, co-located worker, or public).

4.3.2 Accidents

Human Health

Various accident scenarios are calculated for both the public, facility worker, and the co-located worker at PORTS. Doses to the facility worker, co-located worker, and the public associated with general handling accidents, storage area fires, and seismic events are summarized in Table C.8 in Appendix C. The highest radiological risk to the public (0.63 rem dose) is from a storage area fire and to the co-located worker (0.84 rem) is from an earthquake with aerial dispersion of uranium materials. These exposures constitute a low risk and are environmentally negligible.

Biota

For all accident scenarios (see Table D.3), uranium metal toxicity to aquatic biota for both acute and chronic exposure is negligible with all Hazard Quotients (HQs) less than one. An HQ is a ratio, calculated by dividing the environmental concentration of a chemical constituent by that chemical's acute or chronic toxicity benchmark for a given ecological receptor. If the HQ is less than 1, adverse affects to the receptor are assumed to be negligible, where as an HQ greater than 1 implies potential adverse impacts.

4.4 PADUCAH GASEOUS DIFFUSION PLANT

The proposed action is to place up to 3800 MTU of nuclear materials product currently stored at the FEMP site to another DOE-ORO site. PGDP qualifies as such a site and has a long history of handling uranium and other nuclear products.

4.4.1 Normal Operations

At PGDP, site construction of two TSSs, including a concrete pad, would be required to store the uranium product. Land use would not be altered since the TSS location would be in the middle of the industrial part of the plant, and the proposed location would not impact any known cultural resources. BMPs will be followed during construction, and no impacts to water resources or aquatic biota or habitat are expected. The infrastructure is expected to be unchanged. Some compaction of the soil under the concrete pad would occur, but in the long term this effect is negligible.

Some minor and temporary fugitive dust would be generated during the grading of the site before the concrete pad is installed. Also, construction equipment would temporarily increase airborne exhaust emissions. These emissions would be typical of other common construction practices, and impacts would be temporary and negligible.

The TSS location would involve the permanent removal of approximately 1 acre of open field habitat. Plants and non-mobile animals occupying the site would be killed, and animals that currently use the field for foraging or nesting habitat would have to relocate. However, the amount of habitat affected is very small

in relation to the size of similar habitat in and around the PGDP site, and impacts to the ecosystem are minor. No threatened or endangered species, or their habitat, would be affected.

The socioeconomic impact analysis assumes a maximum of \$5 million in construction expenditures to be spent in the current fiscal year, and a maximum of three FTE jobs required to operate the facility. Assuming all of the construction funds are spent on labor and that the three new facility employees earn the average per capita income for the ROI, the impact on income in the first year would be \$5.07 million, or 0.3% of the ROI 1996 baseline. This represents a conservative upper bound, since some of the construction investment will represent materials purchases rather than labor, and actual construction expenditures may be smaller. After the first year, the impact on income would be limited to the salaries of the three employees, an even smaller fraction of the local economic base.

The impact on employment is similarly small. Assuming that the construction workers each earn the average per capita income, the initial \$5 million expenditure implies roughly 212 construction jobs in the first year and three full-time workers to operate the facility. The first-year impact then represents 0.5% of the wage and salary workers shown in Table 3.3. For subsequent years, the impact of three full-time jobs in this county is negligible. If the new employees moved into the region with their families, the impact on the population base would be even smaller than the employment impact.

Based on this analysis, the proposed action would be inconsequential. In the absence of any important impacts including effluent releases, environmental justice concerns do not arise.

During storage of uranium materials, workers could be exposed to direct radiation from surface contamination on the storage containers. However, the containers have been checked, overpacked if deemed necessary, and certified for transport before storage. Therefore, worker exposure due to routine operations associated with surveillance and maintenance of stored materials is expected to be less than detectable levels.

In addition to surface contamination, radiation doses from the stored uranium materials can be expected. Dose rates from any single stored container are no more than 3 to 4 mrem/h. The dose rate at a distance of 1 ft from a container is ~1 mrem/h, and the dose rate at a distance of 20 ft is <0.5 mrem/h (approximately the same as normal background radiation doses). These dose rates are not affected by stacking the containers because the containers and the materials themselves provide significant shielding. These dose rates are considered negligible to any receptor (facility worker, co-located worker, or public).

4.4.2 Accidents

Various accident scenarios are calculated for both the public, facility worker, and the co-located worker at PGDP. Doses to the facility worker, co-located worker, and the public associated with general handling accidents, storage area fires, and seismic events are summarized in Table C.8 in Appendix C. The highest radiological risk to the public (0.63 rem dose) is from a storage area fire and to the co-located worker (0.84 rem) is from an earthquake with aerial dispersion of uranium materials. These exposures constitute a low risk and are environmentally negligible.

4.5 Y-12 PLANT

The proposed action is to place up to 3800 MTU of nuclear materials product currently stored at the FEMP site to another DOE-ORO site. The Y-12 Plant qualifies as such a site and currently is storing some LEU onsite.

4.5.1 Normal Operations

Storage of uranium products at the Y-12 Plant would involve preparation of existing buildings (9720-33 and 9204-4) including removing some existing materials from 9720-33 and building upgrades. The west end of the Y-12 Plant where these two buildings are located is highly developed and industrialized. Land use would not be altered. There would be no impact to cultural resources, biota, water resources, the infrastructure (except minor improvements to the buildings themselves), or geology and soils. Some very minor air emissions would be associated with preparing the buildings for receipt of uranium.

The socioeconomic impact analysis assumes a maximum of \$5 million in construction expenditures to be spent in the current fiscal year, and a maximum of three FTE jobs required to operate the facility. If one assumes that all of the construction funds are spent on labor and that the three new facility employees earn the average per capita income for the ROI, the impact on income in the first year would be \$5.06 million, or 0.2% of the ROI 1996 baseline. This represents a conservative upper bound, since some of the construction investment will represent materials purchases rather than labor and actual construction expenditures may be smaller. After the first year, the impact on income would be limited to the salaries of the three employees, an even smaller fraction of the local economic base.

The impact on employment is similarly small. If one assumes that the construction workers each earn the average per capita income, the initial \$5 million expenditure implies approximately 236 construction jobs in the first year, and three full-time workers to operate the facility. The first-year impact then represents 0.4% of the wage and salary workers shown in Table 3.4. For subsequent years, the impact of three full-time jobs in this region is negligible. If the new employees moved into the region with their families, the impact on the population base would be even smaller than the employment impact.

Based on this analysis, the proposed action would be inconsequential. In the absence of any important impacts including effluent releases, environmental justice concerns do not arise.

During storage of uranium materials, workers could be exposed to direct radiation from surface contamination on the storage containers. However, the containers have been checked, overpacked if deemed necessary, and certified for transport before storage. Therefore, worker exposure due to routine operations associated with surveillance and maintenance of stored materials is expected to be less than detectable levels.

In addition to surface contamination, radiation doses from the stored uranium materials can be expected. Dose rates from any single stored container are no more than 3 to 4 mrem/h. The dose rate at a distance of 1 ft from a container is ~1 mrem/h, and the dose rate at a distance of 20 ft is <0.5 mrem/h (approximately the same as normal background radiation doses). These dose rates are not affected by stacking the containers because the containers and the materials themselves provide significant shielding. These dose rates are considered negligible to any receptor (facility worker, co-located worker, or public).

4.5.2 Accidents

Various accident scenarios are calculated for both the public, facility worker, and the co-located worker at the Y-12 Plant. Doses to the facility worker, co-located worker, and the public associated with general handling accidents, storage area fires, and seismic events are summarized in Table C.8 in Appendix C. The highest radiological risk to the public (0.63 rem dose) is from a storage area fire and to the co-located worker (0.84 rem) is from an earthquake with aerial dispersion of uranium materials. These exposures constitute a low risk and are environmentally negligible.

4.6 EAST TENNESSEE TECHNOLOGY PARK

The proposed action is to place up to 3800 MTU of nuclear materials product currently stored at the FEMP site to another DOE-ORO site. The ETTP, formerly known as the ORGDP or K-25 Site, qualifies as such a site and has a long history of handling uranium and other nuclear products.

4.6.1 Normal Operations

Both the use of existing buildings (K-131 and K-631) and the site construction of two TSSs at two possible locations (K-861 Open Area and K-1066F Area) were evaluated. At each TSS location a concrete pad would be constructed. Land use would not be altered since the buildings and the TSS locations would be within the boundaries of the industrial part of the plant. None of the three proposed locations for uranium storage would impact any known cultural resources. BMPs will be followed during construction of the TSSs at the K-861 Open Area and the K-1066F Area, and no impacts to water resources or aquatic biota or habitats are expected. The infrastructure is expected to remain unchanged. Some compaction of the soil under the concrete pads would occur, but in the long term this effect is insignificant.

Some minor and temporary fugitive dust would be generated during the grading of the sites before the concrete pads are installed. Also, construction equipment would temporarily increase airborne exhaust emissions. These emissions would be typical of other common construction practices, and impacts would be temporary and insignificant.

The TSS locations would involve the permanent removal of approximately 1 acre of open field habitat at each of the two locations (K-861 Open Area and K-1066F Area). Plants and non-mobile animals occupying the sites would be killed, and animals that currently use the fields for foraging or nesting habitat would have to relocate. However, the amount of habitat affected is very small in relation to the size of similar habitat in and around the ETTP site, and impacts are insignificant. No threatened or endangered species, or their habitat, would be affected.

Since the ROI for this alternative is the same as for the Y-12 Plant alternative in Sect. 4.4.1, the calculations are identical. Based on this analysis, the proposed action will have no significant socioeconomic impact. In the absence of significant impacts, environmental justice concerns do not arise.

During storage of uranium materials, workers could be exposed to direct radiation from surface contamination on the storage containers. However, the containers have been checked, overpacked if deemed necessary, and certified for transport before storage. Therefore, worker exposure due to routine operations associated with surveillance and maintenance of stored materials is expected to be less than detectable levels.

In addition to surface contamination, radiation doses from the stored uranium materials can be expected. Dose rates from any single stored container are no more than 3 to 4 mrem/h. The dose rate at a distance of 1 ft from a container is ~1 mrem/h, and the dose rate at a distance of 20 ft is <0.5 mrem/h (approximately the same as normal background radiation doses). These dose rates are not affected by stacking the containers because the containers and the materials themselves provide significant shielding. These dose rates are considered negligible to any receptor (facility worker, co-located worker, or public).

4.6.2 Accidents

Human Health

Various accident scenarios are calculated for both the public, facility worker, and the co-located worker at ETTP. Doses to the facility worker, co-located worker, and the public associated with general handling accidents, storage area fires, and seismic events are summarized in Table C.8 in Appendix C. Risks to the public are dependent on how close the proposed storage locations are to the public. The K-1066F Area has the highest radiological risk to the public (1.26 rem, which is still low) with the other areas and buildings at ETTP having a negligible risk. This risk is associated with aerial dispersion of uranium materials after an earthquake. These exposures constitute a low risk and are environmentally negligible.

Biota

For all accident scenarios (see Table D.2), uranium metal toxicity to aquatic biota for both acute and chronic exposure is negligible with all HQs less than one.

4.7 CONCLUSIONS

Construction-related impacts at all sites are minor to negligible. The sites that propose the use of TSSs (PGDP and the K-861 Open Area and K-1066F Area at ETTP) would have approximately 1 acre of land, which is now open grass habitat, converted permanently to buildings. However, this acreage is unimportant in comparison to the similar acreage in and around these plant sites. TSSs are proposed at the X-7745R Storage Area at PORTS, but a concrete pad already exists and only very minor land disturbance would occur.

Operations impacts are also negligible. Routine operations would result in negligible risks. Accident-related risks range from negligible for general handling (off-loading operations, storage, and maintenance) at all sites to negligible and low risk at various sites, depending on the type of accident involved. Generally, dispersion of uranium material associated with a storage area fire and/or earthquake results in the highest radiological risk. Even the highest radiological risk to both the public and the co-located worker (1.26 rem) at the K-1066F Area at ETTP is still considered a low risk and is environmentally insignificant. Uranium metal toxicity to aquatic biota from all accident scenarios at all sites is negligible.

4.8 CUMULATIVE IMPACTS

All four DOE-ORO sites have been and are still undergoing changes from their historical missions. Environmental cleanup has become a majority priority over the past decade, the need for uranium production has declined sharply, and the facilities at all the sites are aging. Cumulative impacts are impacts associated with the proposed action when combined with other past, present, or reasonably foreseeable future impacts. There are no significant impacts associated with the proposed action, except for potential short-term effects to aquatic biota at two sites under worst-case accident conditions. When the insignificant impacts associated with construction and normal operation of the proposed storage facilities are added to the baseline environment at each of the sites, and taking into account historical uses and projected future changes, no significant cumulative impacts would occur. The receipt and storage of the uranium materials at one or more of the DOE-ORO sites has the effect either of using existing buildings or developing small (approximately 1-acre) areas within heavily industrialized sites which are undergoing the changes mentioned above. Cumulative impacts from these actions are minimal and insignificant.

5. REFERENCES

- DOE (U.S. Department of Energy) 1994. Environmental Assessment for the Proposed Sale of Radioactively-Contaminated Nickel Ingots Located at the Paducah Gaseous Diffusion Plant, Paducah, Kentucky. May. Oak Ridge Operations.
- DOE 1997a. Final Environmental Assessment, Lease of Land and Facilities within the East Tennessee Technology Park, Oak Ridge, Tennessee. DOE/EA-1175. November. Oak Ridge, Tennessee, Oak Ridge Operations Office.
- DOE 1997b. Final Waste Management Programmatic Environmental Impact Statement for Managing Treatment, Storage and Disposal of Radioactive and Hazardous Waste. DOE/EIS-200-F. May. Washington, D.C., Office of Environmental Management.
- DOE 1997c. Report on the Remedial Investigation of Bear Creek Valley at the Oak Ridge Y-12 Plant, Oak Ridge, Tennessee, Volume I. DOE/OR/01-1455/V1&D2. March. Oak Ridge, Tennessee.
- DOE 1998. Report on the Remedial Investigation of Upper East Fork Poplar Creek Characterization Area at the Oak Ridge Y-12 Plant, Oak Ridge, Tennessee, Volume I. DOE/OR/01-1641/V1&D2. August. Oak Ridge, Tennessee.
- Mason, C. Science Applications International Corporation 1999. Personal communication to Scott Toler, Fernald Site (January 13, 1999).
- Oak Ridge Chamber of Commerce website, www.orcc.org/labor.html.
- Oak Ridge National Laboratory 1998. Oak Ridge Reservation Annual Site Environmental Report for 1997. ES/ESH-78. October. Oak Ridge, Tennessee.
- Sheppard, M. I., and D. H. Thibault 1990. "Default Soil Solid/Liquid Partition Coefficients for Four Major Soil Types: A Compendium." *Health Phys.*, 59(4), pp. 471-482.
- U.S. Bureau of Economic Analysis 1998. BEA website, www.bea.doc.gov.

5-1

==

6. LIST OF PREPARERS

Name	Degree/Discipline	Professional Experience	Responsibility
Wayne Tolbert	Ph.D. Ecology	23 years experience in environmental compliance; 18 years in NEPA compliance	Project Manager; primary customer point of contact; overall responsibility for EA; affected environment and normal operations impacts
Timothy Solack	M.S. Civil Engineering	20 years experience in engineering, radiation safety, and safety analysis	Deputy Project Manager; Engineering walk-down of PORTS and Fernald sites; safety analysis
Carol Mason	M.S. Chemical Engineering	20 years experience in engineering, radiation safety, and safety analysis	Accident analysis development and calculations
Karen Golden	Ph.D. Microbiology	12 years experience in human health risk assessment and public health	Human health risk and environmental risk of accidents
Vicki Brumback	M.S. Geology	10 years experience in environmental fate and transport	Environmental risk of accidents; fate and transport
Sharon Bell	M.S. Economics	21 years experience in socioeconomics, environmental justice, and statistics	Socioeconomics including environmental justice
Steven Mitz	M.S. Aquatic Toxicology	17 years experience in aquatic toxicology, chemistry and NEPA aquatic impact assessment	Aquatic ecology
Issac Diggs, P.E.	M.S. Engineering Mechanics	25 years experience, including5 years at the Fernald site	Technical review
Alauddin Khan	Ph.D. Chemical Engineering	9 years experience	Contaminant fate and transport (pathways development)
James Elmore	Ph.D. Ecology	18 years NEPA experience	Purpose and need; DOE technical reviewer

DOE = U.S. Department of Energy
EA = Environmental Assessment
NEPA = National Environmental Policy Act
PORTS = Portsmouth Gaseous Diffusion Plant

7. LIST OF AGENCIES/INDIVIDUALS CONSULTED

This chapter contains copies of correspondence with the State Historic Preservation Officers (SHPOs) in Tennessee, Kentucky, and Ohio and with the U.S. Fish and Wildlife Service and state conservation departments.



Department of Energy

Oak Ridge Operations Office P.O. Box 2001 Oak Ridge, Tennessee 37831—

March 9, 1999

Mr. Joseph Garrison Tennessee Historical Commission Department of Environment and Conservation 2941 Lebanon Road Nashville, Tennessee 37243-0442

Dear Mr. Garrison:

NATIONAL HISTORIC PRESERVATION ACT, SECTION 106 COMPLIANCE, RECEIPT AND STORAGE OF URANIUM MATERIALS FROM FERNALD ENVIRONMENTAL PROJECT - OAK RIDGE OPERATIONS

Enclosed is a Project Summary for the proposed Receipt and Storage of Uranium Materials from the Fernald Environmental Management Project. A description and discussion of the proposed project is included in the enclosed Project Summary and Archeological Historical Review (AHR).

The Department of Energy Oak Ridge Operations (DOE ORO) has determined that the proposed project would have no effect on historical, archeological, or cultural resources included or eligible for inclusion in the National Register of Historic Places (National Register). This determination is included with the Project Summary. This type of proposed activity is addressed in the Programmatic Agreement Among The Department Of Energy Oak Ridge Operations Office, The Tennessee State Historic Preservation Officer, And The Advisory Council On Historic Preservation Concerning The Management Of Historical And Cultural Properties At The Oak Ridge Reservation (PA) in Section III. Section A.2.B.

DOE ORO requests documentation of your concurrence with the determination for the proposed Tennessee sites. With your concurrence DOE ORO's responsibilities for compliance with Section 106 of the National Historic Preservation Act as related to the proposed activities in Tennessee will be completed for this project.

If you have questions or need additional information related to this proposed project please call me at (423) 576-9574.

Sincerely,

Ray T. Moore

DOE ORO Cultural Resources Management Coordinator

Enclosure

cc w/enclosure:

Richard Frounfelker, EM-96, ETTP Site Office Susan Morris, DP-81, Y-12 Site Office Dave Snyder, Ohio Historic Preservation Office, OH David Morgan, Kentucky Heritage Council and State Historic Preservation Office EC Document Center Bldg. 9734, MS-8130 (w/maps)

PROJECT SUMMARY

312 1

SECTION 106 ARCHEOLOGICAL AND HISTORICAL REVIEW

RECEIPT AND STORAGE OF URANIUM MATERIALS

FROM FERNALD ENVIRONMENTAL MANAGEMENT PROJECT

PROPOSED ACTION: The U. S. Department of Energy Oak Ridge Operations (DOE ORO), is in the process of preparing an Environmental Assessment (EA), DOE/ORO-2078, for the Receipt and Storage and Uranium Materials from the Fernald Environmental Management Project (FEMP). Storage at a licensed, commercial facility was also initially considered but was ruled out because of schedule constraints. The no action alternative is to leave the uranium at FEMP.

LOCATION OF THIS ACTION: Five DOE site alternatives were considered for receipt and storage of these materials, Oak Ridge National Laboratory (ORNL) in Anderson County, the Y-12 Plant in Anderson County, and the East Tennessee Technology Park (ETTP) in Roane County, and also Portsmouth Gaseous Diffusion Plant (PORTS), Paducah Gaseous Diffusion Plant (PGDP). The ORNL site was dropped from consideration due to mission-related land use conflicts. At some of these DOE sites, various locations/building variations were considered.

DISCUSSION: DOE proposes to place up to 3800 Metric Tons Uranium (MTU) of nuclear materials product currently stored at the FEMP site at another suitable DOE site. The type and amount of uranium product is listed in Table 2.1.

Table 2.1. FEMP Uranium Proposed for Receipt and Storage at Other DOE Site(s)

Uranium	Pounds (millions)	Metric Tons Uranium (MTU)	Storage Space Requirements (approximate in ft ²)
Normal	0.434	193	600
Depleted	7.085	2,761	17,200
Low-Enriched	<u>2.205</u>	<u>799</u>	12,500
TOTALS	9.724	3,753	30,300

Receipt and storage of the uranium products would require that suitable existing buildings with sufficient floor space at the various DOE sites be made available. Approximately 50,000 ft² of space is required, and buildings would have to be available in time to receive all product before the end of the fourth quarter of FY 1999. Alternatively, if existing buildings are not available, an area where at least two Tension-Support Structures (TSSs) would be built (or a combination thereof). These TSSs would have concrete floors, a rigid frame, and tarpaulin roof and sides, and

they would provide approximately 27,000 ft² each in storage space. DOE inventoried buildings and space availability at five sites — three sites (the Y-12 Plant, ORNL, and ETTP) in Oak Ridge, Tennessee; Portsmouth, Ohio; and Paducah, Kentucky. The ORNL site was dropped from consideration due to mission-related land use conflicts.

Tennessee Sites

Enclosed are figures 2.4 and 2.5, from the draft EA, showing the various building locations proposed at the Oak Ridge Reservation. Two existing buildings, 9204-4 and 9720-33, are proposed to be used at the Y-12 Plant. Building 9204-4 was identified as a contributing property to the proposed Y-12 Historic District. Building 9720-33 was constructed in 1967 and is not a contributing property. Two existing buildings, K-131 and K-631, and two open areas (K-861 and 1066F) are proposed at the ETTP. Buildings K-131 and K-631 are located in the K-25 Historic District and are contributing properties. K-861 is located in the K-25 Historic District and 1066F is not located in the K-25 Historic District. Neither of these open areas are considered eligible or contributing properties for inclusion in the National Register of Historic Places. The proposed project would not require modification to any of the buildings and only a TSS would be added to the open areas.

DETERMINATION: DOE ORO personnel have reviewed this proposed project in accordance with the Programmatic Agreement (PA) Among the Department of Energy, Oak Ridge Operations, the Tennessee State Historic Officer, and the Advisory Council on Historic Preservation Concerning Management of Historical and Cultural Properties at the Oak Ridge Reservation. The proposed project is addressed in the PA in Section III. Section A.2. B. DOE ORO has determined that the proposed project would have no adverse effect on historical, archeological, or cultural resources included or eligible for inclusion in the National Register of Historic Places for the proposed Y-12 and ETTP sites located in Tennessee.



Department of Energy

Oak Ridge Operations Office P.O. Box 2001 Oak Ridge, Tennessee 37831—

March 9, 1999

Mr. David Morgan Kentucky Heritage Council and State Historic Preservation Office 300 Washington Street Frankfort, Kentucky 40601

Dear Mr. Morgan:

NATIONAL HISTORIC PRESERVATION ACT, SECTION 106 COMPLIANCE, RECEIPT AND STORAGE OF URANIUM MATERIALS FROM FERNALD ENVIRONMENTAL MANAGEMENT PROJECT - OAK RIDGE OPERATIONS

Enclosed is a Project Summary for the proposed Receipt and Storage of Uranium Materials from the Fernald Environmental Management Project. A description and discussion of the proposed project is included in the enclosed Project Summary and Archeological Historical Review (AHR).

The Department of Energy Operations (DOE ORO) has determined that the proposed project would have no effect on historical, archeological, or cultural resources included or eligible for inclusion in the National Register of Historic Places (National Register). This determination is included with the Project Summary.

DOE ORO requests documentation of your concurrence with the determination for the proposed Paducah Gaseous Diffusion Plant, Kentucky site. With your concurrence DOE ORO's responsibilities for compliance with Section 106 of the National Historic Preservation Act as related to the proposed activities in Kentucky will be completed for this project.

If you have questions or need additional information related to this proposed project please call me at (423) 576-9574.

Sincerely,

Ray T. Moore

DOE ORO Cultural Resources Management Coordinator

Enclosure

cc w/enclosure:
David Tidwell, EF-22, PORTS
Wayne Tolbert, SAIC, OR
Joseph Garrison, Tennessee Historical Commission
Dave Snyder, Ohio Historic Preservation Office
EC Document Center Bldg. 9734, MS-8130 (w/maps)

PROJECT SUMMARY

SECTION 106 ARCHEOLOGICAL AND HISTORICAL REVIEW

RECEIPT AND STORAGE OF URANIUM MATERIALS

FROM FERNALD ENVIRONMENTAL PROJECT

PROPOSED ACTION: The U. S. Department of Energy Oak Ridge Operations (DOE ORO), is in the process of preparing an Environmental Assessment (EA), DOE/ORO-2078, for the Receipt and Storage and Uranium Materials from the Fernald Environmental Management Project (FEMP). Storage at a licensed, commercial facility was also initially considered but was ruled out because of schedule constraints. The no action alternative is to leave the uranium at FEMP.

LOCATION OF THIS ACTION: Five DOE site alternatives were considered for receipt and storage of these materials, Oak Ridge National Laboratory (ORNL), the Y-12 Plant, and the East Tennessee Technology Park (ETTP) in Oak Ridge Tennessee, the Portsmouth Gaseous Diffusion Plant (PORTS), and the Paducah Gaseous Diffusion Plant (PGDP). The ORNL site was dropped from consideration due to mission-related land use conflicts. At some of these DOE sites, various locations/building variations were considered.

DISCUSSION: DOE proposes to place up to 3800 Metric Tons Uranium (MTU) of nuclear materials product currently stored at the FEMP site at another suitable DOE site. The type and amount of uranium product is listed in Table 2.1.

Table 2.1. FEMP Uranium Proposed for Receipt and Storage at Other DOE Site(s)

Uranium	Pounds (millions)	Metric Tons Uranium (MTU)	Storage Space Requirements (approximate in ft²)
Normal	0.434	193	600
Depleted	7.085	2,761	17,200
Low-Enriched	<u>2.205</u>	<u>799</u>	12,500
TOTALS	9.724	3,753	30,300

Receipt and storage of the uranium products would require that suitable existing buildings with sufficient floor space at the various DOE sites be made available. Approximately 50,000 ft² of space is required, and buildings would have to be available in time to receive all product before the end of the fourth quarter of FY 1999. Alternatively, if existing buildings are not available, an area where at least two tension-support structures (TSSs) would be built (or a combination

thereof). These TSSs would have concrete floors, a rigid frame, and tarpaulin roof and sides, and they would provide approximately 27,000 ft² each in storage space. DOE inventoried buildings and space availability at five sites — three sites (the Y-12 Plant, ORNL, and ETTP) in Oak Ridge, Tennessee; PORTS, Portsmouth, Ohio; and PGDP, Paducah, Kentucky. The ORNL site was dropped from consideration due to mission-related land use conflicts.

PGDP Site - Kentucky

Enclosed is figure 2.3, from the draft EA, showing the proposed location at the PGDP in Paducah Kentucky. The proposed location is an open areas in the previously disturbed plant area and two TSSs would need to be built at this area.

DETERMINATION: DOE ORO personnel have reviewed this proposed project and has determined that the proposed project would have no adverse effect on historical, archeological, or cultural resources included or eligible for inclusion in the National Register of Historic Places for the proposed site at PGDP.



Department of Energy

Oak Ridge Operations Office P.O. Box 2001 Oak Ridge, Tennessee 37831—

March 9, 1999

Mr. Dave Snyder Ohio Historic Preservation Office 567 Hudson Street Columbus, Ohio 43211-1030

Dear Mr. Snyder:

NATIONAL HISTORIC PRESERVATION ACT, SECTION 106 COMPLIANCE, RECEIPT AND STORAGE OF URANIUM MATERIALS FROM FERNALD ENVIRONMENTAL MANAGEMENT PROJECT - OAK RIDGE OPERATIONS

Enclosed is a Project Summary for the proposed Receipt and Storage of Uranium Materials from the Fernald Environmental Management Project. A description and discussion of the proposed project is included in the enclosed Project Summary and Archeological Historical Review (AHR).

The Department of Energy Oak Ridge Operations (DOE ORO) has determined that the proposed project would have no effect on historical, archeological, or cultural resources included or eligible for inclusion in the National Register of Historic Places (National Register). This determination is included with the Project Summary.

DOE ORO requests documentation of your concurrence with the determination for the proposed PORTS, Ohio site. With your concurrence DOE ORO's responsibilities for compliance with Section 106 of the National Historic Preservation Act as related to the proposed activities in Ohio will be completed for this project.

If you have questions or need additional information related to this proposed project please call me at (423) 576-9574.

Sincerely,

Ray(T. Moore

DOE ORO Cultural Resources Management Coordinator

Enclosure

cc w/enclosure:
Dee Perkins, EF-21, PORTS
Wayne Tolbert, SAIC, OR
Joseph Garrison, Tennessee Historical Commission
David Morgan, Kentucky Heritage Council
and State Historic Preservation Office
EC Document Center Bldg. 9734, MS-8130 (w/maps)

PROJECT SUMMARY

SECTION 106 ARCHEOLOGICAL AND HISTORICAL REVIEW

RECEIPT AND STORAGE OF URANIUM MATERIALS

FROM FERNALD ENVIRONMENTAL MANAGEMENT PROJECT

PROPOSED ACTION: The U. S. Department of Energy Oak Ridge Operations (DOE ORO), is in the process of preparing an Environmental Assessment (EA), DOE/ORO-2078, for the Receipt and Storage and Uranium Materials from the Fernald Environmental Management Project (FEMP). Storage at a licensed, commercial facility was also initially considered but was ruled out because of schedule constraints. The no action alternative is to leave the uranium at FEMP.

LOCATION OF THIS ACTION: Five DOE site alternatives were considered for receipt and storage of these materials, Oak Ridge National Laboratory (ORNL), the Y-12 Plant, and the East Tennessee Technology Park (ETTP) in Oak Ridge Tennessee, the Portsmouth Gaseous Diffusion Plant (PORTS), and the Paducah Gaseous Diffusion Plant (PGDP). The ORNL site was dropped from consideration due to mission-related land use conflicts. At some of these DOE sites, various locations/building variations were considered.

DISCUSSION: DOE proposes to place up to 3800 Metric Tons Uranium (MTU) of nuclear materials product currently stored at the FEMP site at another suitable DOE site. The type and amount of uranium product is listed in Table 2.1.

Table 2.1. FEMP Uranium Proposed for Receipt and Storage at Other DOE Site(s)

Uranium	Pounds (millions)	Metric Tons Uranium (MTU)	Storage Space Requirements (approximate in ft ²)
Normal	0.434	193	600
Depleted	7.085	2,761	17,200
Low-Enriched	2.205	<u>799</u>	12,500
TOTALS	9.724	3,753	30,300

Receipt and storage of the uranium products would require that suitable existing buildings with sufficient floor space at the various DOE sites be made available. Approximately 50,000 ft² of space is required, and buildings would have to be available in time to receive all product before the end of the fourth quarter of FY 1999. Alternatively, if existing buildings are not available, an area where at least two Tension-Support Structures (TSSs) would be built (or a combination thereof). These TSSs would have concrete floors, a rigid frame, and tarpaulin roof and sides, and

they would provide approximately 27,000 ft² each in storage space. DOE inventoried buildings and space availability at five sites — three sites (the Y-12 Plant, ORNL, and ETTP) in Oak Ridge, Tennessee; PORTS, Portsmouth, Ohio; and PGDP, Paducah, Kentucky. The ORNL site was dropped from consideration due to mission-related land use conflicts.

PORTS Site - Ohio

Enclosed is figure 2.2, from the draft EA, showing the various building locations proposed at the PORTS Site in Portsmouth Ohio. Eight existing buildings were identified that could be used for storage of the FEMP material. The proposed project would not require modification to any of the buildings. One outside storage area was identified. This storage area is within the previously disturbed plant area and a concrete pad is presently at this location. One TSS would need to be built at this area.

DETERMINATION: DOE ORO personnel have reviewed this proposed project and has determined that the proposed project would have no adverse effect on historical, archeological, or cultural resources included or eligible for inclusion in the National Register of Historic Places for the proposed sites at PORTS.

Oak Ridge Operations Office

nemorandum

DATE:

(4/93

April 5, 1999

REPLY TO

ATTN OF: SE-32:Moore

SUBJECT: NATIONAL HISTORIC PRESERVATION ACT, SECTION 106 COMPLIANCE, RECEIPT AND STORAGE OF URANIUM MATERIALS FROM FEMP - OAK RIDGE **OPERATIONS**

J. Dale Jackson, Executive Director, Office of Assistant Manager for Enrichment Facilities, EF-20

Attached is a letter from the Tennessee State Historic Preservation Officer (SHPO) that concurs with the Department of Energy Oak Ridge Operations (DOE ORO) determination that the proposed project would have no effect on historical, archeological, or cultural resources included or eligible for inclusion in the National Register of Historic Places (National Register) in the State of Tennessee. With the SHPO's determination, DOE ORO has complied with Section 106 of the National Historic Preservation Act for proposed activities in Tennessee.

If you have questions or need additional information please call me at (423) 576-9574.

7-15

DOE ORO Cultural Resources Management Coordinator

Attachment

cc w/attachment:

Richard Frounkfelker, EM-96, ETTP Site Office Susan Morris, DP-81, Y-12 Site Office David Tindell, EF-22, PAD Dee Perkins, EF-21, PORTS Sheila Thornton, BJC LLC, Bldg. K-1550-E, MS 7235 Jennifer Webb, LMES, Bldg. 9115, MS 8219, Y-12 James Hall, LMER, Bldg. 1061, MS-6429 Mick Wiest, LMES, Bldg. 9116, MS 8098, Y-12 Jack Newman, BJC LLC, 55 Jefferson, Room 117, MS 7604 Wayne Tolbert, SAIC, Oak Ridge Dave Snyder, Ohio Historic Preservation Office David Morgan, Kentucky Heritage Council and State Historic Preservation Office

EC Document Center Bldg. 9734, MS-8130



TENNESSEE HISTORICAL COMMISSION

DEPARTMENT OF ENVIRONMENT AND CONSERVATION 2941 LEBANON ROAD NASHVILLE, TN 37243-0442 (615) 532-1550

March 17, 1999

Mr. Ray T. Moore USDOE/Oak Ridge Operations Post Office Box 2001 Oak Ridge, Tennessee 37831-8739

RE: DOE, ORNL/URANIUM STORAGE/FERNAND, OAK RIDGE, ANDERSON COUNTY

Dear Mr. Moore:

Pursuant to your request received on Wednesday, March 10, 1999, this office has reviewed documentation concerning the above-referenced undertaking. This is a quirement of the Agreement Document ratified to ensure compliance with Section 106 of e National Historic Preservation Act as codified at 36 CFR 800 (51 FR 31115, September 2, 1986) and an Agreement Document

Considering available information, we find that the project as currently proposed will not adversely affect any property that is eligible for listing in the National Register of Historic Places. Therefore, this office has no objection to the implementation of this project. Please direct questions and comments to Joe Garrison (615)532-1559. We appreciate your cooperation.

Sincerely,

Herbert L. Harper

Executive Director and

Deputy State Historic

Preservation Officer

HLH/jyg

OFFICIAL FILE COPY

Leg No C Var

Data Received MAR 23 1993

File Code 2/82,/5



March 11, 1999

James L. Elmore
Department of Energy
Oak Ridge Operations Office
P.O. Box 2001
Oak Ridge, TN 37831

Dear Dr. Elmore:

Your letter to Jennifer Windus regarding the receipt and storage of uranium materials from the Fernald site was referred to me for response. I have enclosed listings of rare animals and plants recorded in our Natural Heritage Database for Butler and Hamilton counties (FEMP site) and for Pike County (Portsmouth Gaseous Diffusion Plant site). Scientific name, common name state and federal status are shown for each species. Status code definitions are provided on an accompanying sheet.

I have also included our data request form and brochure should you require a more detailed database search for your sites. Please note that we charge for this service. You can contact me at (614) 265-6472 if you have any questions about these materials.

Sincerely,

Patricia D. Jones

Data Services Administrator

Division of Natural Areas & Preserves

Enclosures

AMILISO
LOGIO COMMINICATION MAR 15 1999
For local

<u>.</u>

Division of Natural Areas and Preserves Ohio Department of Natural Resources

Endangerment Codes

Federal Status Codes

LE= Endangered

LT= Threatened

PE= Proposed Endangered

PT= Proposed Threatened

Ohio Status Codes

Animals: (Assigned by the Ohio Division of Wildlife)

E= State Endangered

* T= Threatened (not a legal designation)

* S= Special Interest (not a legal designation)

* X= Extirpated from Ohio

* Animals without a status are inventoried by the Division of Natural Areas & Preserves, but have not been assigned a state status by the Ohio Division of Wildlife.

Plants: (Assigned by the Division of Natural Areas & Preserves)

E= State Endangered

T= State Threatened

* P= Potentially threatened (not a legal designation)

* X= Presumed extirpated from Ohio

* A= A species recently added to the inventory, a state endangerment status has not yet been determined.

* Administrative statuses, these are not legal designations.

PAGE: 1

OHIO DEPARTMENT OF NATURAL, RESOURCES

Ė

ONTO DEFARIMENT OF NATURAL RESOURCES DIVISION OF NATURAL AREAS & PRESERVES BUTLER COUNTY: RARE ANIMAL & PLANT SPECIES	L OHIO SCIENTIFIC NAME: STATUS	T BARTRAMIA LONGICAUDA	CAMBARUS ORTMANNI	T CLONOPHIS KIRTLANDII	E EURYCEA LUCIFUGA	T EXOGLOSSUM LAURAE	S HIODON TERGISUS	E IXOBRYCHUS EXILIS	E MYOTIS SODALIS	T ORCONECTES SLOANII	S PORZANA CAROLINA	ARABIS HIRSUTA VAR.	X CUSCUTA PENTAGONA	E ECHINODORUS ROSTRATUS	T LOPHOTOCARPUS CALYCINUS	E RIBES MISSOURIENSE	T SALIX CAROLINIANA	T SILENE NIVEA	E VIBURNUM MOLLE	
	FEDERAL STATUS								LE											

COMMON NAME

and tannas and tall	CINCINNATI CRAVETSH	KTRTI, AND'S SNAKE	CAVE SALAMANDER	TONGUETIED MINNOW	MOONEYE	LEAST BITTERN	INDIANA BAT	BLACK-CROWNED NIGHT-HERON	SLOAN'S CRAYFISH	SORA			FIVE-ANGLED DODDER	BUR-HEAD	SOUTHERN WAPATO	NODDING RATTLESNAKE BOOT	MISSOITRI GOOGRADOV	CAROLINA WILLOW	SNOWY CAMPION	COFF-T-TANY
BARTRAMIA LONGICAUDA	CAMBARUS ORTMANNI	CLONOPHIS KIRTLANDII	EURYCEA LUCIFUGA	EXOGLOSSUM LAURAE	HIODON TERGISUS	IXOBRYCHUS EXILIS	MYOTIS SODALIS	NYCTICORAX NYCTICORAX	ORCONECTES SLOANII	PORZANA CAROLINA	ARABIS HIRSUTA VAR. ADPRESSIPILIS	ARABIS HIRSUTA VAR. PYCNOCARPA	CUSCUTA PENTAGONA	ECHINODORUS ROSTRATUS	LOPHOTOCARPUS CALYCINUS	PRENANTHES CREPIDINEA	RIBES MISSOURIENSE	SALIX CAROLINIANA	SILENE NIVEA	VIBURNUM MOLLE

21 Records Processed

PAGE:

HAMILTON COUNTY: RARE ANIMAL & PLANT SPECIES DIVISION OF NATURAL AREAS & PRESERVES OHIO DEPARTMENT OF NATURAL RESOURCES

> FEDERAL STATUS

YELLOW-CROWNED NIGHT-HERON BLACK-CROWNED NIGHT-HERON BEETLE EASTERN HOGNOSE SNAKE THREEHORN WARTYBACK HAWK COBBLESTONE TIGER LOGGERHEAD SHRIKE ROUGH GREEN SNAKE SMOOTH SOFTSHELL AMERICAN BITTERN KIRTLAND'S SNAKE PURPLE WARTYBACK FALSE MAP TURTLE CAVE SALAMANDER MOUNTAIN MADTOM NORTHERN MADTOM RIVER REDHORSE SHARP-SHINNED SILVER LAMPREY LAKE STURGEON BIGEYE SHINER LARK SPARROW FLAT FLOATER ELEPHANT-EAR COMMON NAME BLUE SUCKER SEDGE WREN EBONYSHELL HICKORYNUT BUTTERFLY WASHBOARD SNUFFBOX MOONEYE BURBOT ELLIPTIO CRASSIDENS CRASSIDENS GRAPTEMYS PSEUDOGEOGRAPHICA CICINDELA MARGINIPENNIS ANODONTA SUBORBICULATA CYCLONAIAS TUBERCULATA ICHTHYOMYZON UNICUSPIS CISTOTHORUS PLATENSIS BOTAURUS LENTIGINOSUS HETERODON PLATIRHINOS NYCTICORAX NYCTICORAX ACIPENSER FULVESCENS CHONDESTES GRAMMACUS ELLIPSARIA LINEOLATA EPIOBLASMA TRIQUETRA CLONOPHIS KIRTLANDII CYCLEPTUS ELONGATUS LANIUS LUDOVICIANUS MOXOSTOMA CARINATUM NYCTANASSA VIOLACEA MEGALONAIAS NERVOSA ACCIPITER STRIATUS NOTURUS ELEUTHERUS OBLIQUARIA REFLEXA OPHEODRYS AESTIVUS NOTURUS STIGMOSUS OBOVARIA OLIVARIA EURYCEA LUCIFUGA HIODON TERGISUS SCIENTIFIC NAME FUSCONAIA EBENA APALONE MUTICA NOTROPIS BOOPS LOTA LOTA STATUS OHIO $\Omega \times \Omega$ пппнпппппппппп оныопоныынныо

. Bud

COMMON NAME	SLOAN'S CRAYFISH SLENDERHEAD DARTER RIVER DARTER SHEEPNOSE OHIO PIGTOE SORA PINK PAPERSHELL MONKEYFACE WARTYBACK RED-EARED SLIDER FAWNSFOOT DEERTOG SPRING CORAL-ROOT FEW-FLOWERED TICK-TREFOIL FOUR-ANGLED SPIKERUSH BUTTERNUT DWARF BULRUSH SOUTHERN WAPATO RIVERBANK PASPALUM PASSION-FLOWER FERN-LEAF SCORPION-WEED CAROLINA RUELLIA LONG-BEAKED ARROWHEAD CAROLINA WILLOW PURSH'S BULRUSH VIRGINIA MALLOW SMOOTH BUTTONWEED	RUNNING BUFFALO CLOVER PRAIRIE WAKE-ROBIN THREE-BIRDS-ORCHID SOUTHERN BLACK-HAW
SCIENTIFIC NAME	ORCONECTES SLOANII PERCINA PHOXOCEPHALA PERCINA SHUMARDI PLETHOBASUS CYPHYUS PLEUROBEMA CORDATUM PORZANA CAROLINA PORZANA CAROLINA PORZANA CAROLINA PORZANA CAROLINA CUADRULA METANEVRA QUADRULA METANEVRA CUADRULA MODULATA TRUNCILLA TRUNCATA CORALLORHIZA WISTERIANA DESMODIUM PAUCIFLORUM ELEOCHARIS QUADRANGULATA JUGLANS CINEREA LIPOCARPHA MICRANTHA LOPHOTOCARPHA MICRANTHA LOPHOTOCARPHA MICRANTHA LOPHOTOCARPHS CALYCINUS PASSIFLORA INCARNATA PHACELIA BIPINNATIFIDA RUELLIA CAROLINIENSIS SAGITTARIA AUSTRALIS SIDA HERMAPHRODITA SPERMACOCE GLABRA	TRIFOLIUM STOLONIFERUM TRILLIUM RECURVATUM TRIPHORA TRIANTHOPHORA VIBURNUM RUFIDULUM
OHIO STATUS	нотычатачатачата	ጃዕጉጋ
FEDERAL STATUS	; ;	I E

COMMON NAME

SCIENTIFIC NAME

OHIO

FEDERAL STATUS

PIKE COUNTY: RARE ANIMAL & PLANT SPECIES DIVISION OF NATURAL AREAS & PRESERVES OHIO DEPARTMENT OF NATURAL RESOURCES

SOUTHERN HAIRY ROCK-CRESS BRADLEY'S SPLEENWORT PURPLE TRIPLE-AWNED THREEHORN WARTYBACK MARROW-LEAVED ASTER SHARP-SHINNED HAWK CHUCK-WILL'S-WIDOW FIMBER RATTLESNAKE BLUNTLEAF MILKWEED FROST CAVE ISOPOD ROUGH GREEN SNAKE TURTLE YELLOW SANDSHELL BLACK KINGSNAKE PINK PAPERSHELL RIVER REDHORSE SILVER LAMPREY GREEN MILKWEED ROSYSIDE DACE SHORTNOSE GAR ROCK SANDWORT BIGEYE SHINER BEWICK'S WREN EBONYSHELL FALSE MAP PADDLEFISH SHEEPNOSE FAWNSFOOT SNUFFBOX WALL-RUE GOLDEYE MOONEYE DEERTOE ADPRESSIPILIS LAMPSILIS TERES ANODONTOIDES GRAPTEMYS PSEUDOGEOGRAPHICA LAMPROPELTIS GETULA NIGRA CAPRIMULGUS CAROLINENSIS CLINOSTOMUS FUNDULOIDES LEPISOSTEUS PLATOSTOMUS ASCLEPIAS AMPLEXICAULIS ICHTHYOMYZON UNICUSPIS ASPLENIUM RUTA-MURARIA TRUNCILLA DONACIFORMIS PURPURASCENS VIRIDIFLORA EPIOBLASMA TRIQUETRA MOXOSTOMA CARINATUM ARABIS HIRSUTA VAR. PLETHOBASUS CYPHYUS THRYOMANES BEWICKII ACCIPITER STRIATUS TRUNCILLA TRUNCATA OBLIQUARIA REFLEXA OPHEODRYS AESTIVUS POTAMILUS OHIENSIS CAECIDOTEA ROTUNDA ASPLENIUM BRADLEYI ASTER SOLIDAGINEUS CROTALUS HORRIDUS POLYODON SPATHULA HIODON ALOSOIDES ARENARIA STRICTA FUSCONAIA EBENA HIODON TERGISUS NOTROPIS BOOPS ASCLEPIAS ARISTIDA STATUS ы н о о о о о о о н н н пинопононионнонн

GRASS

INDIGO

DIVISION OF NATURAL AREAS & PRESERVES OHIO DEPARTMENT OF NATURAL RESOURCES

STATUS

. ئۇنى

LARGE YELLOW LADY'S-SLIPPER WEDGE-LEAF WHITLOW-GRASS MICHAUX'S LEAVENWORTHIA PENNESSEE BLADDER FERN NARROW-LEAVED SUMMER SHORT'S HEDGE-HYSSOP SLENDER BLAZING-STAR THREE-FLOWERED MELIC GREEN ADDER'S-MOUTH WHITE THOROUGHWORT THYME-LEAF PINWEED WESTERN SUNFLOWER AMERICAN CHESTNUT GRAPE HONEYSUCKLE DWARF HACKBERRY TURK'S-CAP LILY REFLEXED SEDGE ONE-SIDED RUSH PRAIRIE FALSE BUTTERFLY-PEA TANSY-MUSTARD JUNIPER SEDGE GLADE SPURGE DIFFUSE RUSH GROOVED FLAX COMMON NAME INLAND RUSH BLUEHEARTS WEAK SEDGE BUTTERNUT ANGLE-POD BUR-HEAD MILK-PEA PIKE COUNTY: RARE ANIMAL & PLANT SPECIES PUBESCENS CAREX RETROFLEXA VAR. RETROFLEXA CAREX DEBILIS VAR. DEBILIS CYPRIPEDIUM CALCEOLUS VAR. CYSTOPTERIS TENNESSEENSIS HELIANTHUS OCCIDENTALIS LEAVENWORTHIA UNIFLORA ECHINODORUS ROSTRATUS JUNCUS DIFFUSISSIMUS DESCURAINIA PINNATA LONICERA RETICULATA LIATRIS CYLINDRACEA BUCHNERA AMERICANA EUPHORBIA PURPUREA GALACTIA VOLUBILIS GRATIOLA VISCIDULA HEDYOTIS NIGRICANS JUNIPERORUM CELTIS TENUIFOLIA DRABA CUNEIFOLIA EUPATORIUM ALBUM CASTANEA DENTATA CLITORIA MARIANA MALAXIS UNIFOLIA SCIENTIFIC NAME BAPTISIA LACTEA JUGLANS CINEREA JUNCUS SECUNDUS INTERIOR LILIUM SUPERBUM MATELEA OBLIQUA LINUM SULCATUM MELICA NITENS LECHEA MINOR JUNCUS STATUS OHIO FEDERAL,

BLUETS

PLANT SPECIES DIVISION OF NATURAL AREAS & PRESERVES OHIO DEPARTMENT OF NATURAL RESOURCES PIKE COUNTY: RARE ANIMAL

FLAN			
B			
ALN I MAL			
NA NE		 NAME	
THE COMIT WAKE ANIMAL & PLAN		SCIENTIFIC NAME	
1		OHIO	STATUS
	٠.	FEDERAL	STATUS

Д	ONOSMODIUM HISPIDISSIMIM	TIEMMOOD GOINE
Д	OPUNTIA HUMIFUSA	DDICKIN DEAD
Д	ORBEXILUM PEDUNCULATUM	FAIGH COIDE FEAK
Д	PANICUM LAXIFLORUM	HALLE SCOKE FERENCE FINAL PRINCE
Ħ	PANICUM VERRUCOSUM	KATO CINKO VERNE KATO CINKO VERNE
ሲ	PHACELIA BIPINNATIFIDA	THE PART I TAKE
Д,	PHASEOLUS POLYSTACHIOS	MILL VINNEY DONE
Ы	PHYLLANTHUS CAROLINIENSIS	THE TANGET PER
E→	POLYGALA INCARNATA	CANCULINA DEAF-F DINK MII VAODE
പ	QUERCUS MARILANDICA	BING MILLAWORI
Q .	RHEXIA VIRGINICA	VIDCINIA MENDOS
Ħ	RHODODENDRON CALENDULACEUM	VINGINIA MEALOW FIAME AVALEA

COMMON NAME

RHODODENDRON NUDIFLORUM VAR. ROSEUM SILENE CAROLINIANA VAR. WHERRYI SCUTELLARIA INTEGRIFOLIA SAGITTARIA AUSTRALIS SCLERIA TRIGLOMERATA SILENE ROTUNDIFOLIA SCIRPUS PURSHIANUS

SPARGANIUM ANDROCLADUM SPIRANTHES LUCIDA 日日日日日日日日日日日日日日日

SULLIVANTIA SULLIVANTII STENANTHIUM GRAMINEUM SPIRANTHES OVALIS

TRICHOSTEMA DICHOTOMUM VAR. LINEARE VERBESINA HELIANTHOIDES TRIFOLIUM REFLEXUM

VERBESINA OCCIDENTALIS

'ERN-LEAF SCORPION-WEED PALE GREEN PANIC-GRASS /IRGINIA MEADOW-BEAUTY CONG-BEAKED ARROWHEAD ROUND-LEAVED CATCHFLY AROLINA LEAF-FLOWER NORTHERN ROSE AZALEA JARTY PANIC-GRASS WHERRY'S CATCHFLY ILLD KIDNEY BEAN PALSE SCURF-PEA PURSH'S BULRUSH HYSSOP SKULLCAP KEELED BUR-REED JINK MILKWORT LACKJACK OAK TALL NUT-RUSH FLAME AZALEA

NARROW-LEAVED BLUECURLS YELLOW CROWNBEARD HAIRY WING-STEM BUFFALO CLOVER SULLIVANTIA

SHINING LADIES'-TRESSES

LESSER LADIES'-TRESSES

FEATHER-BELLS

Records Processed 92



DATA REQUEST

OHIO DEPARTMENT OF NATURAL RESOURCES DIVISION OF NATURAL AREAS AND PRESERVES HERITAGE DATA SERVICES 1889 FOUNTAIN SQUARE COURT, BUILDING F-1 COLUMBUS, OHIO 43224 PHONE: 614-265-6453; FAX: 614-267-3096

INSTRUCTIONS:

Please fill out both sides of this data request form, sign it and return it to the address or fax number listed above along with: (1) a letter formally requesting data and describing your project, and (2) a map detailing the boundaries of your study area. A photocopy from the pertinent portion of a USGS 7.5 minute topographic map is preferred but other maps are acceptable. Our turnaround time is two weeks, although we can often respond more quickly.

FEES:

Fees are determined by the amount of time it takes to complete your project. The charge is \$25.00 per ½ hour with a ½ hour minimum. We can perform a data search manually or by computer. The Heritage Data Services staff will determine the most cost-efficient method of doing your search. A cost estimate can be provided upon request. Unless otherwise specified, an invoice will accompany the data services response.

This request is being submitted by: □ fax □ mail □ both
Date:
Your Agency/Organization:
Your Name/Title:
Addréss:
City/State/Zip:
Phone/Fax:
Project Name/Number:
Project is located on the following USGS 7.5 minute topographic map(s):
If there is a program or contracting agency requiring this information, please give the name and phone number of a contact person:
DNR 5203

DNR 520: REV 9/97

**



United States Department of the Interior

FISH AND WILDLIFE SERVICE

Ecological Services 6950 Americana Parkway, Suite H Reynoldsburg, Ohio 43068-4132

March 12, 1999

James L. Elmore, Ph.D.
Department of Energy
Oak Ridge Operations Office
P.O. Box 2001
Oak Ridge, Tennessee 37831

Dear Dr. Elmore:

This responds to your request for information about federally listed endangered and threatened species that could be affected by the transfer of Uranium containing materials from the Fernald Environmental Management Project (FEMP) to the Portsmouth Gaseous Diffusion Plant (PORTS), both facilities being located in Ohio. Our comments apply only to the PORTS site in Pike County, Ohio, and do not apply to to FEMP or the route of transfer.

ENDANGERED SPECIES COMMENTS: The project lies within the range of the Indiana bat, a federally listed endangered species. Due to the project type, size, and location, the proposed project will have no effect on this species. This precludes the need for further action on this project under the 1973 Endangered Species Act, as amended. Should the project be modified or new information become available that indicates listed or proposed species may be affected, consultation should be initiated with this office.

Two divisions of the Ohio Department of Natural Resources, the Division of Wildlife (614-265-6300) and the Division of Natural Areas and Preserves (614-265-6472), maintain lists of plants and animals of concern to the State of Ohio. If you have not already done so, you may wish to contact each of these agencies to obtain site-specific information on species of state concern.

If you have questions or we may be of further assistance in this matter, please contact Mr. Bill Kurey of this office at 614-469-6923 ext. 14.

Sincerely,

Lent E. Kroonemeyer

Supervisor

OFFICIAL FILE COPY

Log No.__ C 0.162

Date Received MAR 19 1999

cc: J. Marshall, ODOW

73



United States Department of the Interior

FISH AND WILDLIFE SERVICE 446 Neal Street

Cookeville, TN 38501

March 26, 1999

	MESQ
Log No	0421
Date Received	MAR 29 1999
Fila Coda	

Dr. James L. Elmore U.S. Department of Energy Oak Ridge Operations Office P.O. Box 2001 Oak Ridge, Tennessee 37831

Dear Dr. Elmore:

Thank you for your letter and enclosures of March 4, 1999, regarding the preparation of an Environmental Assessment (EA) for the Receipt and Storage of Uranium Materials from the Fernald Environmental Management Project Site. Proposed storage locations include the Paducah Gaseous Diffusion Plant in McCracken County, Kentucky, and two sites on the Oak Ridge Reservation in Anderson and Roane Counties, Tennessee. U.S. Fish and Wildlife Service (Service) personnel have reviewed the information submitted and offer the following comments for consideration.

According to our records, the following federally listed endangered species are known to occur near the potential project impact areas:

Paducah Gaseous Diffusion Plant

Indiana bat (Myotis sodalis)
Orange-foot pimpleback pearlymussel (Plethobasus cooperianus)

Oak Ridge Reservation

Gray bat (Myotis griesescens)
Pink mucket pearlymussel (Lampsilis abrupta)

Qualified biologists should assess potential impacts and determine if the proposed project may affect the species. We recommend that you submit a copy of your assessment and finding to this office for review and concurrence. A finding of "may affect" could require the initiation of formal consultation procedures.

These constitute the comments of the U.S. Department of the Interior in accordance with provisions of the Endangered Species Act (87 Stat. 884, as amended: 16 U.S.C. 1531 et seq.). We appreciate the opportunity to comment. Should you have any questions or need further assistance, please contact Steve Alexander of my staff at 931/528-6481, ext. 210.

Sincerely,

Lee A. Barclay, Ph.D.

Field Supervisor



COMMONWEALTH OF KENTUCKY

KENTUCKY STATE NATURE PRESERVES COMMISSION

801 SCHENKEL LANE FRANKFORT, KENTUCKY 40601-1403 (502) 573-2886 VOICE (502) 573-2355 FAX

March 17, 1999

James L. Elmore, Ph.D. Department of Energy P.O. Box 2001 Oak Ridge, TN 37831 MAR 2 2 1999

Data Request 99-145

Dear Mr. Elmore:

This letter is in response to your data request of 10 March 1999 for the Paducah Gaseous Diffusion Plant project. We have reviewed our Natural Heritage Program Database to determine if any of the endangered, threatened, or special concern plants and animals or exemplary natural communities monitored by the Kentucky State Nature Preserves Commission occur in the area specified on the Heath, Ky. and Joppa, Ill.-Ky. USGS 7.5 minute series topographic quadrangles. Based on our most current information, we have determined that twelve occurrences of the plants or animals and no occurrences of the exemplary natural communities that are monitored by KSNPC are reported as occurring in the specified area. A data report is attached to this response.

Please note that the quantity and quality of data collected by the Kentucky Natural Heritage Program are dependent on the research and observations of many individuals and organizations. In most cases, this information is not the result of comprehensive or site-specific field surveys; many natural areas in Kentucky have never been thoroughly surveyed, and new plants and animals are still being discovered. For these reasons, the Kentucky Natural Heritage Program cannot provide a definitive statement on the presence, absence, or condition of biological elements in any part of Kentucky. Heritage reports summarize the existing information known to the Kentucky Natural Heritage Program at the time of the request regarding the biological elements or locations in question. They should never be regarded as final statements on the elements or areas being considered, nor should they be substituted for on-site surveys required for environmental assessments. We would greatly appreciate receiving any pertinent information obtained as a result of on-site surveys.



Data Request 99-145 March 17, 1999 Page 2

If you have any questions or if I can be of further assistance, please do not hesitate to contact me.

Sincerely,

Amy Co√ert

Acting Data Manager

BDF/ALC

Enclosures: Data Interpretation Key

Endangered, Threatened, and Special Concern Plants and Animals of Kentucky

Plants and Animals Presumed Extinct or Extirpated from Kentucky

Monitored Natural Communities of Kentucky

Data Key for Element and Occurrence Reports (v. 3.98)

Kentucky State Nature Preserves Commission Natural Heritage Program Data Services

Many of the data fields on the enclosed report are easily understood. Other fields, however, use abbreviations and formats that are not always self-explanatory. A key to these fields follows. Your report may contain some or all of the following data fields.

BEARING: Bearing in degrees from a center point to an occurrence's latitude and longitude. This

field is masked for sensitive occurrences; contact KSNPC in these cases. Omitted for

G, U, and Q precision occurrence records.

Best available reference to the occurrence: literature citation, collector, collection BESTSOURCE:

number, museum or herbarium code, etc.

Additional information about the occurrence including identification, taxonomy, or date COMMENTS:

of occurrence.

Directions to an occurrence. This field is masked for sensitive occurrences; contact DIRECTIONS:

KSNPC in these cases.

DISTANCE: Distance from a center point to an occurrence's latinude and longitude. Units coded as

M (miles), K (kilometers), and F (feet). This field is masked for sensitive occurrences; contact KSNPC in these cases. Omitted for G, U, and Q precision occurrence records.

ELCODE: Element (species) code.

EOCODE: Element (species) code, occurrence number (last three digits), and state.

EODATA: Occurrence population data: date of observation, number of individuals, health, size of

colony, flowering data, etc.

EORANK: Judgement of occurrence quality: A = excellent, B = good, C = marginal, D = poor,

E = verified extant but quality not judged, O = obscure (not found at reported site but more searching needed), H = historically known from site but no known observation or

collection since 1975, X = extirpated from site.

FIRSTOBS: Year of first known observation or collection.

GENDESC: Description of an occurrence's habitat.

GRANK: Estimate of element abundance on a global scale: G1 = extremely rare, G2 = rare, G3

= uncommon, G4 = common, G5 = very common, GH = historically known and expected to be rediscovered, GU = uncertain, GX = extinct. Subspecies and variety abundances are coded with a 'T' suffix; the 'G' portion of the rank then refers to the

entire species.

HABITAT: General description of the element's habitat across its range.

IDENT: Whether the identification has been checked by a reliable individual and is believed to

be correctly identified: Y = identification confirmed and believed correct, N = No, identification determined to be wrong despite reports to the contrary, ? = Whether identification is correct or not is confusing or disputed, blank or U = unknown whether

identification correct or not, assumed correct.

KSNPC: Kennicky State Nature Preserves Commission status: N or blank = none, E = endan-

gered, T = threatened, S = special concern, H = historic, X = extirpated.

LASTOBS: Year(-month-date) of most recent known observation or collection.

LAT: Latitude. This field is masked for sensitive occurrences; contact KSNPC in these cases.

Omitted for G, U and Q precision occurrences.

LONG: Longitude. This field is masked for sensitive occurrences; contact KSNPC in these

cases. Omitted for G, U and Q precision occurrences.

MAP NUMBER: Number used to location the element on KSNPC Heritage maps.

MARGNUM:

See MAP NUMBER, PREC: See PRECISION.

PRECISION: Precision of the latitude, longitude, directions, and plotted location: S = location

accurate to within three seconds of latitude-longitude, M = location accurate to within

one minute of latitude-longitude, G = location plotted according to general locality information and accurate to one USGS 7.5 minute quadrangle, Q = element known from the quadrangle but site-specific locations are not recorded by KSNPC because the species may be relatively frequent on the quadrangle or is known to frequently move, U or blank = accuracy of location unknown or not specified.

The accuracy of an occurrence's location is designated by the precision code assigned to the record. Only 'S' precision occurrence records are reliably mapped at or near their precise locations. While an attempt is made to map 'M' precision occurrences as accurately as possible, the plotted locations, lat, long, directions, bearing, and distance data fields may or may not be correct. 'G' and 'Q' precision occurrence locations are very unreliable and only should be used to indicate the possibility that the species is in the area.

SPROT:

See KSNPC.

SRANK:

Estimate of element abundance in Kentucky: S1 = extremely rare, S2 = rare, S3 = uncommon, S4 = many occurrences, S5 = very common, SA = accidental in state, SE = exotic, SH = historically known in state, SN = migratory or nonbreeding, SR = reported but without persuasive documentation, SRF = reported falsely in literature, SU

= uncertain, SX = extirpated.

USESA:

U.S. Fish and Wildlife Service status: N or blank = none, C1 = category 1 status review, C2 = category 2 status review, 3A = considered to be extinct, 3B = not considered a species under the Endangered Species Act, 3C = considered to be more abundant than previously thought, LT = listed as threatened, LE = listed as endangered.

PT = proposed as threatened, PE = proposed as endangered.

WATERBODY:

Name of the the EPA Waterbody in which the occurrence is plotted. Codes used are:

D-downstream, M-mainstem, T-tributary.

WATERSHED:

See WATERBODY.

Endangered, Threatened, Special Concern, and Historic Plants and Animals of Kentucky

Kentucky State Nature Preserves Commission July, 1997

	STAT			STAT	TUS
	KSNPC	US		KSNPC	U
NONNA CCTIVAD DE	> 1000 C				
NONVASCULAR PLA	INTS		Aristida ramosissima	H	
	_		Branched three-awn grass		
Sphagnum quinquefarium	E		Armoracia lacustris	T	
A sphagnum moss			Lake cress		
Tortula norvegica	Ε		Aster concolor	T	
Tortula		•	Eastern silvery aster		
			Aster drummondii var. texanus	T	
VASCULAR PLANT	ΓS		Texas aster		
			Aster hemisphericus	E	
Acer spicatum	Ε		Tennessee aster	~	
Mountain maple			Aster phyllolepis	S	
Aconitum uncinatum	Т		Western silky aster	•	
Blue monkshood	•		Aster pilosus var. priceae	Т	
Adiantum capillus-veneris	Т		White heath aster		
Southern maidenhair-fern	•		Aster saxicastellii	Т	
Adlumia fungosa	E		Rockcastle aster	1	
Climbing fumitory	L		Aureolaria patula	S	
desculus pavia	Т		Spreading false foxglove	3	
Red buckeye	1		Baptisia australis var. minor	c	
lgalinis obtusifolia	É		Blue wild indigo	S	
Ten-lobe false foxglove	E		Baptisia bracteata vat. leucophaea	C	
galinis skinneriana	y			S	
Pale false foxglove	E		Cream wild indigo		
	c		Baptisia tinctoria	T	
Igeratina luciae-brauniae	S		Yellow wild indigo	-	
Lucy Braun's white snakeroot	-		Bartonia virginica	T	
grimonia gryposepala	T		Yellow screwstem		
Tall hairy groovebur			Berberis canadensis	E	
mianthium muscitoxicum	Τ		American barberry		
Fly-poison			Berchemia scandens	T	
msonia tabernaemontana var. gattingeri	T		Supplejack		
Eastern blue-star			Botrychium matricariifolium	Ε	
nemone canadensis	H		Matricary grapefern		
Canada anemone			Botrychium oneidense	E	
ngelica triquinata	Ε		Blunt-lobe grapefern		
Filmy angelica			Boykinia aconitifolia	T	
pios priceana	Ε	LT	Brook saxifrage		
Price's potato-bean			Cabomba caroliniana	Ţ	
rabis missouriensis	Е		Carolina fanwort	•	
Missouri rock cress			Calamagrostis canadensis var. macouniano	z E	
rabis perstellata	Τ	LE	Blue-joint reed grass	-	
Braun's rock cress	-		Calamagrostis porteri ssp. insperata	E	
			Reed bent grass	-	

Endangered, Threatened, Special Concern, and Historic Plants and Animals of Kentucky (July, 1997)

	STATUS		STA	ΓUS	- :
	KSNPC US		KSNPC	US	
Calamagrostis porteri ssp. porteri	т	Contillation			_
Porter's reed grass	•	Castilleja coccinea	E		
Callirhoe alcaeoides	Н	Scarlet Indian paintbrush			
Clustered poppy-mallow	**	Ceanothus herbaceus	T		
Calopogon tuberosus	Е	Prairie redroot			
Grass-pink	L	Cheilanthes alabamensis	E		
Calycanthus floridus var. glaucus	Т	Alabama lip fem			
Sweetshrub	1	Cheilanthes feei	E		
Calylophus serrulatus	Н	Fee's lip fem			
Yellow evening primrose	11	Chelone obliqua var. obliqua	E		
Carex aestivalis	E	Red turtlehead			
Summer sedge	E	Chelone obliqua var. speciosa	S		
Carex alata	Т	Rose turtlehead			
Broadwing sedge	1	Chrysogonum virginianum	E		
Carex atlantica ssp. capillacea	Ė	Green-and-gold			
Prickly bog sedge	Ē	Chrysosplenium americanum	E		
Carex austrocaroliniana	Ċ	American golden-saxifrage			
Tarheel sedge	S	Cimicifuga rubifolia	T		
Carex buxbaumii	E	Appalachian bugbane			
Brown bog sedge	E	Circaea alpina	S		
Carex comosa	7.7	Small enchanter's-nightshade			
Bristly sedge	Н	Clematis crispa	Т		
Carex crawei	C	Blue jasmine leather-flower			
Crawe's sedge	S	Coeloglossum viride var. virescens	H		
Carex crebriflora	T	Long-bract green orchis			
Coastal plain sedge	Т	Collinsonia verticillata	E		
Carex decomposita	T	Whorled horse-balm			
Epiphytic sedge	T	Comptonia peregrina	E		
Carex gigantea	T	Sweet-fern			
Large sedge	T	Conradina verticillata	Ε	LT	
Large seuge Larex hystericina	7.7	Cumberland-rosemary			
Porcupine sedge	Н	Convallaria montana	Ε		
Carex joorii	-	American lily-of-the-valley			
· · · · · · · · · · · · · · · · · · ·	Е	Corallorrhiza maculata	E		
Cypress-swamp sedge Carex juniperorum	-	Spotted coralroot			
Cedar sedge	E	Coreopsis pubescens	S		
Carex lanuginosa		Star tickseed			
Woolly sedge	E	Crataegus engelmannii	Н		
arex leptonervia	_	Engelmann's hawthorn			
Finely-nerved sedge	E	Cymophyllus fraserianus	E		
	_	Fraser's sedge			
arya aquatica Water hickory	T	Cyperus plukenetii	Н		
astanea dentata	-	Plukenet's cyperus			(
American chestnut	E	Cypripedium candidum	E		
astanea pumila	_	Small white lady's-slipper			
-	T	Cypripedium kentuckiense	S		
Allegheny chinkapin		Kentucky lady's-slipper			

\$**

	STATUS		STAT	rus
	KSNPC US		KSNPC	US
Cypripedium parviflorum	Т	Eupatorium steelei	E	
Small yellow lady's-slipper		Steele's joe-pye-weed	L	
Cypripedium reginae	Н	Euphorbia mercurialina	Т	
Showy lady's-slipper		Mercury spurge	1	
Delphinium carolinianum	Т	Fimbristylis puberula	Т	
Carolina larkspur	-	Hairy fimbristylis	,	
Deschampsia cespitosa ssp. glauca	Ë	Forestiera ligustrina	S	
Tufted hair grass	_	Upland privet	3	
Deschampsia flexuosa	Т	Gentiana decora	c	
Crinkled hair grass	•	Showy gentian	S	
Dichanthelium boreale	S	Gentiana flavida	-	
Northern witch grass	5	•	E	
Didiplis diandra	S	Yellow gentian	-	
Water-purslane	5	Gentiana puberulenta	Е	
Dodecatheon frenchii	S	Prairie gentian Glandularia canadensis	~	
French's shooting-star	ي ن		T	
Draba cuneifolia	E	Rose verbena	_	
	E	Glyceria acutiflora	T	
Wedge-leaf whitlow-grass	r	Sharp-scaled manna grass		
Drosera brevifolia Dwarf sundew	Е	Gnaphalium helleri var. micradenium	Н	
		Small rabbit-tobacco		
Drosera intermedia	Н	Gratiola pilosa	T	
Spoon-leaved sundew		Shaggy hedge-hyssop	_	
Dryopteris carthusiana	S	Gratiola viscidula	S	
Spinulose wood fern	11	Short's hedge-hyssop	_	
Dryopteris ludoviciana	Н	Gymnopogon ambiguus	S	
Southern shield wood fern	Ψ.	Bearded skeleton grass	_	
Echinodorus berteroi	T	Gymnopogon brevifolius	E	
Burhead	_	Shortleaf skeleton grass		
Echinodorus parvulus	E	Halesia tetraptera	T	
Dwarf burhead	6	Common silverbell		
Eleocharis olivacea	S	Hedeoma hispidum	T	
Olivaceous sedge	_	Rough pennyroyal		
Elodea nuttallii	Ť	Helianthemum bicknellii	T	
Waterweed		Plains frostweed		
Elymus svensonii	S	Helianthemum canadense	E	
Svenson's wild rye	_	Canada frostweed		
Eriophorum virginicum	E	Helianthus eggertii	T	PΤ
Tawny cotton-grass		Eggert's sunflower		
Eryngium integrifolium	E	Helianthus silphioides	E	
Blue-flower coyote-thistle		Silphium sunflower		
Erythronium rostratum	S	Heracleum lanatum	È	
Golden-star		Cow-parsnip		
Eupatorium maculatum	Н	Heteranthera dubia	S	
Spotted joe-pye-weed		Grassleaf mud-plantain		
Eupatorium semiserratum	Е	Heteranthera limosa	S	
Small-flowered thoroughwort		Blue mud-plantain		

Endangered, Threatened, Special Concern, and Historic Plants and Animals of Kentucky (July, 1997)

	STATUS		STATUS	
	KSNPC US		KSNPC US	1 3 1
Heterotheca subaxillaris var. latifolia Broad-leaf golden-aster	Т	Leavenworthia exigua var. laciniata Glade cress	Т	
Hexastylis contracta	E	Leavenworthia torulosa		
Southern heartleaf			T	
Hexastylis heterophylla	S	Necklace glade cress Leiophyllum buxifolium		
Variable-leaved heartleaf		Sand-myrtle	Н	
Hieracium longipilum	Т	Lesquerella globosa	_	
Hairy hawkweed			T	
Houstonia serpyllifolia	E	Lesquereux's bladderpod Lesquerella lescurii		
Michaux's bluets			S	
Hydrocotyle americana	E	Lescur's bladderpod Leucothoe recurva		
American water-pennywort	_	Fetterbush	E	ä
Hydrolea ovata	Е			OTHER BLA
Ovate fiddleleaf	_	Liatris cylindracea	T	7
łydrophyllum virginianum	S	Slender blazingstar		
Virginia waterleaf	S	Lilium philadelphicum	T	
Typericum adpressum	Н	Wood lily		
Creeping St. John's-wort	11	Lilium superbum	T	
lypericum crux-andreae	Т	Turk's cap lily		
St. Peter's-wort	1	Limnobium spongia	T	
Typericum nudiflorum	Н	American frog's-bit		
Pretty St. John's-wort	п	Liparis loeselii	T	-
ypericum pseudomaculatum	17	Loesel's twayblade		1.5
Large spotted St. John's-wort	Н	Listera australis	Е	
ris fulva	r	Southern twayblade		
Copper iris	E	Listera smallii	T	
oeies buileri	Ε.	Kidney-leaf twayblade		
Butler'squillwort	E	Lobelia appendiculata var. gattingeri	E	
oetes melanopoda	_	Gattinger's lobelia		
Blackfoot quillwort	E	Lobelia nuttallii	Т	
iglans cinerea		Nuttall's lobelia		
White walnut	S	Lonicera dioica var. orientalis	E	
incus articulatus		Wild honeysuckle	_	ţ:
Jointed rush	S	Lonicera reticulata	Е	
ncus elliottii	_	Grape honeysuckle	2	
	E	Ludwigia hirtella	E	
Bog rush		Hairy ludwigia	Ļ	
ncus filipendulus	Ť	Lycopodiella appressa	E	
Long-styled rush		Southern bog club-moss	L	
niperus communis vat. depressa	T	Lycopodiella clavatum	Е	
Ground juniper		Running-pine	L	
eleria macrantha	Ε	Lycopodiella inundatum	r	
June grass		Northern bog club-moss	E	ź,
thyrus palustris	Ť	Lysimachia fraseri	177	-
Vetchling peavine		Fraser's loosestrife	E	:-
thyrus venosus	S	Lysimachia radicans	T T	
Smooth veiny peavine		wysunachia radicans	H	

<u></u>		STAT	=		STAT	rus
	****	KSNPC	US		KSNPC	US
1 -	Lysimachia terrestris	E		Nemophila aphylla	7	
	Swamp-candles			Small-flower baby-blue-eyes	T	
	Maianthemum canadense	Т		Nestronia umbellula		
	Wild lily-of-the-valley	•		Conjurer's-nut	E	
,	Maianthemum stellatum	Е		Oenothera linifolia		
: 7	Starflower false solomon's-seal	_		Thread-leaf sundrops	E	
	Malus angustifolia	S		Oenothera oakesiana		
	Southern crabapple	J			Н	
	Malvastrum hispidum	Т		Evening primrose		
	Hispid false mallow	J		Oenothera perennis	E	
	Marshallia grandiflora	E		Small sundrops		
ct n	Barbara's-buttons	E		Oenothera triloba	T	
	Matelea carolinensis	Γ-		Stemless evening-primrose		
	Carolina anglepod	E		Oldenlandia uniflora	E	
	.	T		Clustered bluets		
:	Melampyrum lineare var. latifolium American cow-wheat	T		Onosmodium molle ssp. hispidissimum	E	
				Hairy false gromwell		
	Melampyrum lineare vat. pectinatum	Ē		Onosmodium molle ssp. molle	E	
	American cow-wheat			Soft false gromwell		
	Melanthium parviflorum	E		Onosmodium molle ssp. occidentale	Ε	
1.5	Small-flowered false hellebore			Western false gromwell		
	Melanthium virginicum	E		Orobanche ludoviciana	Н	
	Virginia bunchflower			Louisiana broomrape		
1	Melanthium woodii	T		Orontium aquaticum	Т	
	False hellebore			Goldenciub		
-	Minuartia cumberlandensis	E	LE	Oxalis priceae	Н	
	Cumberland sandwort			Price's yellow wood sorrel		
-	Minuartia glabra	T		Parnassia asarifolia	E	
	Appalachian sandwort			Kidney-leaf grass-of-parnassus		
	Mirabilis albida	Ε		Parnassia grandifolia	E	
	Pale umbrella-wort			Largeleaf grass-of-parnassus		
	Monarda punctata	E		Paronychia argyrocoma	E	
E	Spotted beebalm			Silverling	_	
The second	Monotropsis odorata	T		Paspalum boscianum	S	
*	Sweet pinesap			Bull paspalum	-	
ş	Muhlenbergia bushii	Ε		Paxistima canbyi	Т	
	Bush's muhly			Canby's mountain-lover	•	
1	Muhlenbergia cuspidata	T		Pedicularis lanceolata	Н	
	Plains muhly			Swamp lousewort	**	
: 1	Muhlenbergia glabrifloris	S		Perideridia americana	Т	
	Hair grass			Eastern eulophus	1	
	Myriophyllum heterophyllum	S		Phacelia ranunculacea	c	
-	Broadleaf water-milfoil			Blue scorpion-weed	S	
	Myriophyllum pinnatum	T		Philadelphus inodorus	.	
- 11	Cutleaf water-milfoil	•			Т	
	Najas gracillima	S		Mock orange Philadelphus pubescens	_	
	Thread-like naiad	J			Ε	
				Hoary mock orange		

Endangered, Threatened, Special Concern, and Historic Plants and Animals of Kentucky (July, 1997)

STATUS		ST A TIME	
KSNPC US		T.C	
т		0	
1	Pycnanthemum albescens	E	
~	White-leaved mountain-mint		
i	Pyrola americana	Н	
7.7	American wintergreen	••	
н	Ranunculus ambigens	S	
-	Water-plantain	J	
Ī	Rhododendron canescens	F	
		L	
T		F	
		L	
E	Rhynchospora globularis	c	
	Globe beaked-nish	ప	
E	Rhynchospora macrostachya	Г	
	Tall beaked-rush	E	
S	Ruhus canadensis	-	
		E	
E	Rubus whartonias	_	
		T	
E	Rudhachia subs	•	
		E	
Н			
··,		E	
т			
•		Τ	
E			
L		E	
~			
<u>.</u>		Н	
c		-	
3	Salix discolor	Н	
T	Pussy willow		
ı	Salvia urticifolia	E	
_	Nettle-leaf sage	-	
Ę.	Sambucus racemosa ssp. pubens	F	
_	Red elderberry	2	
Ε	Sanguisorba canadensis	F	
		_	
E		т	
		1	
T		r	
		E	
E	Saxifraga pensulvanica		
		Н	
T	Schisandra alabra	_	
		E	
E			
-	OLIU: UCHAR DNEDNEGGODG	T	
	T T H T E E E T S T S T E T E T E T E	T Pycnanthemum albescens White-leaved mountain-mint Pyrola americana American wintergreen American wintergreen Ranunculus ambigens Water-plantain Rhododendron canescens Hoary azalea Rhynchosia tomentosa Hairy snout-bean Rhynchospora globularis Globe beaked-rush Rhynchospora macrostachya Tall beaked-rush Rubus canadensis Smooth blackberry Rubus whartonise Wharton's dewberry Rubus whartoniae Wharton's dewberry Rudbeckia subtomentosa Sweet coneflower Sabatia campanulata Slender marsh-pink Sagittaria rigida Sessile-fruit arrowhead Saix amygdaloides Peachleaf willow Salix discolor Pussy willow Salix discolor Pussy willow Salvia urticifolia Nettle-leaf sage Sambucus racemosa ssp. pubens Red elderberry Sanguisorba canadensis Canada burnet Saxifraga micranthidifolia Lettuce-leaf saxifrage Saxifraga pensylvanica Swamp saxifrage To Schisandra glabra Bay starvine	T Pycnanthemum albescens White-leaved mountain-mint Pyrola americana H American wintergreen H Ranunculus ambigens Water-plantain T Rhododendron canescens Hairy snout-bean E Rhynchospora globularis S Rubus canadensis E Rubus whartonisa E Sagittaria graminea T Sagittaria graminea E Sagittaria rigida E Sasile-finit arrowhead E Sagittaria rigida E Sasile-finit arrowhead E Salix amygdaloides Peachleaf willow F Pussy willow Salix discolor Pussy willow Salix discolor Pussy willow T Salix arcaemosa ssp. pubens Red elderberry E Sambucus racemosa ssp. pubens Red elderberry Sanguisorba canadensis E Canada burnet Saxifraga micranthidfolia E Saxifraga micranthidfolia Lettuce-leaf saxifrage E Saxifraga pensylvanica H Saxifraga pensylvanica Bay starvine

Endangered, Threatened, Special Concern, and Historic Plants and Animals of Kentucky (July, 1997)

		STA		· · · · · · · · · · · · · · · · · · ·	STA	THE
		KSNPC	US		KSNPC	US
	Schwalbea americana	Н	LE	Solidago squarrosa		
	Chaffseed				Н	
	Scirpus expansus	Ε		Squarrose goldenrod	_	
	Woodland beak-rush	2		Sparganium eurycarpum	E	
	Scirpus fluviatilis	E	•	Large bur-reed		
	River bul-rush	2		Sphenopholis pensylvanica	S	
	Scirpus hallii	E		Swamp wedgescale		
	Hall's bul-rush	-		Spiraea alba	Ē	
	Scirpus heterochaetus	E		Narrow-leaved meadowsweet		
	Slender bul-rush	E		Spiraea virginiana	T	LT
	Scirpus microcarpus	r		Virginia spiraea		
	Small-fruit bul-rush	E		Spiranthes lucida	T	
		_		Shining ladies'-tresses		
	Scirpus verecundus	E		Spiranthes magnicamporum	Т	
	Bashful bul-rush			Great plains ladies'-tresses		
	Scleria ciliata var. ciliata	E		Spiranthes odorata	Е	
	Fringed nut-rush			Sweetscent ladies'-tresses	_	
	Scleria mue lenbergii	Н		Sporobolus clandestinus	Т	
	Pitted nut-rush			Rough dropseed	•	
	Scutellaria saxatilis	T		Sporobolus heterolepis	Ĕ	
	Rock skullcap			Northern dropseed	£	
.4774	Sedum telephioides	Т		Stachys eplingii	E	
	Allegheny stonecrop			Epling's hedge-nettle	E	
	Sida hermaphrodita	S		Stellaria fontinalis	T	
	Virginia-mallow			Water stichwort	T	
	Silene ovata	E		Stellaria longifolia	C	
	Ovate catchfly				S	
	Silene regia	E		Longleaf stitchwort	_	
	Royal catchfly	-		Streptopus roseus var. perspectus	E	
	Silphium laciniatum var. laciniatum	Ē		Rosy twistedstalk	_	
	Compasspiant	L		Symphoricarpos albus	E	
	Silphium laciniatum var. robinsonii	т		Snowberry		
ů,	Compassplant	1		Talinum calcaricum	E	
	Solidago albopilosa	Т	tr	Limestone fameflower		
	White-haired goldenrod	1	LT	Talinum teretifolium	T	
	Solidago buckleyi	c	,	Roundleaf fameflower		
	Buckley's goldenrod	S		Taxus canadensis	T	
	Solidago caesia var. curtisii	~		Canadian yew		
		Т		Tephrosia spicata	Е	
	Curtis' goldenrod	_		Spiked hoary-pea		
	Solidago puberula	S		Thaspium pinnatifidum	Т	
	Downy goldenrod			Cutleaf meadow-parsnip		
	Solidago roanensis	T		Thermopsis mollis	Е	
	Roan mountain goldenrod			Soft-haired thermopsis	_	
	Solidago shortii	E	LE	Thuja occidentalis	T	
	Short's goldenrod			Northern white-cedar	•	
	Solidago simplex ssp. randii	S		Torreyochloa pallida	E	
	Rand's goldenrod			Pale manna grass	L	

Endangered, Threatened, Special Concern, and Historic Plants and Animals of Kentucky (July, 1997)

		ATUS		STAT	TT:C
	KSNP	C US		KSNPC	US
Toxicodendron vernix Poison sumac	E		Xerophyllum asphodeloides	Н	
Tragia urticifolia Nettle-leaf noseburn	E		Eastern turkeybeard Xyris difformis	E	
Trepocarpus aethusae Trepocarpus	Т		Carolina yellow-eye-grass Zizania palustris var. interior	Н	
Trichostema setaceum Narrow-leaved bluecurls	E		Indian wild rice Zizaniopsis miliacea	Т	
Trientalis borealis Northern starflower	E		Southern wild rice		
Trifolium reflexum Buffalo clover	Е		ANIMALS		
Trifolium stoloniferum Running buffalo clover	Τ	LE	Gastropods		
Trillium nivale Snow trillium	E		Anguispira rugoderma Pine Mountain disc	T	
Trillium pusillum var. ozarkanum Ozark least trillium	E		Antroselatus spiralis Shaggy cavesnail	S	
Trillium pusillum var. pusillum Least trillium	Е		<i>Glyphyalinia raderi</i> Maryland glyph	S	
Trillium undulatum Painted trillium	Т		Glyphyalinia rhoadsi Sculpted glyph	Т	-11
Triplasis purpurea	Н		Helicodiscus notius specus A snail	Т	0.00
Purple sand grass Ulmus serotina	S		Helicodiscus punctatellus Punctate coil	S	
September elm Utricularia macrorhiza	E		Leptoxis praerosa Onyx rocksnail	S	
Greater bladderwort Vallisneria americana	S		Lithasia armigera Armored rocksnail	S	
Eel-grass Cernonia noveboracensis	S		Lithasia geniculata Ornate rocksnail	S	
New York ironweed 'eronica americana	Н		Lithasia salebrosa Muddy rocksnail	S	
American speedwell iburnum molle	T		Lithasia verrucosa Varicose rocksnail	S	
Missouri arrow-wood iburnum nudum	E		Mesodon chilhoweensis	S	
Possum haw viburnum iola septemloba var. egglestonii	S		Queen crater Mesodon panselenus	S	
Eggleston's violet iola walteri	т		Virginia bladetooth Mesodon wetherbyi	S	
Walter's violet itis rupestris	T		Clifty covert Mesomphix rugeli	т	
Sand grape Soodsia appalachiana	_		Wrinkled button Pilsbryna sp. 1	E	
Mountain woodsia	E		A snail (undescribed) Pleurocera alveare Rugged homsnail	S	

Endangered, Threatened, Special Concern, and Historic Plants and Animals of Kentucky (July, 1997)

	STA			STAT	ΓUS
, , , , , , , , , , , , , , , , , , ,	KSNPC	US		KSNPC	U
Pleurocera curta	C		•		
	S		Lasmigona subviridis	E	
Shortspire hornsnail	_		Green floater		
Rabdotus dealbatus	Т		Lexingtonia dolabelloides	· H	
Whitewashed rabdotus			Slabside pearlymussel		
Rhodacme elatior	S		Obovaria retusa	E	L
Domed ancylid			Ring pink	_	~
Triodopsis dentifera	T		Pegias fabula	E	L
Big-tooth whitelip			Little-wing pearlymussel		سيد
Triodopsis multilineata	Τ		Plethobasus cooperianus	E	L
Striped whitelip			Orange-foot pimpleback	E.	L
Vertigo bollesiana	E			~	
Delicate vertigo			Plethobasus cyphyus	S	
Vertigo clappi	Е	-	Sheepnose		
Cupped vertigo	E		Pleurobema clava	E	L
Vitrinizonites latissimus	~		Clubshell		
	Τ		Pleurobema oviforme	E	
Glassy grapeskin			Tennessee clubshell		
			Pleurobema plenum	E	L
Unionids (Mussels)			Rough pigtoe	* · = .	
			Pleurobema pyramidatum	E	
Alasmidonta atropurpurea	E	LE	Pyramid pigtoe		
Cumberland elktoe			Potamilus capax	E	L
Alasmidonta marginata	т		Fat pocketbook	_	
Elktoe	•		Potamilus purpuratus	E	
Anodontoides denigratus	E		Bleufer	L	
Cumberland papershell			Ptychobranchus subtentum	Т	
Cumberlandia monodonia	Е		Fluted kidneyshell	1	
Speciaclecase	L		Quadrula cylindrica cylindrica	Τ.	
Cyprogenia stegaria	-		Rabbitsfoot	Т	
Fanshell	Ε	LE		_	
			Simpsonaias ambigua	Т	
Epioblasma brevidens	E	LE	Salamander mussel		
Cumberlandian combshell	_		Toxolasma lividum	E	
Epioblasma capsaeformis	Е	LE	Purple lilliput		
Oyster mussel			Toxolasma texasensis	Ē	
Epioblasma obliquata obliquata	Ē	LE	Texas lilliput		
Catspaw			Villosa fabalis	E	
Epioblasma torulosa rangiana	E	LE	Rayed bean		
Northern riffleshell			Villosa lienosa	S	
Epioblasma triquetra	S		Little spectaclecase		
Snuffbox			Villosa ortmanni	Т	
Fusconaia subrotunda subrotunda	Т		Kentucky creekshell	•	
Long-solid	•		Villosa trabalis	E	LI
Lampsilis abrupta	Е	LE	Cumberland bean	L	r.
Pink mucket	£	LE	Villosa vanuxemensis	ኍ	
Lampsilis ovata	r		Mountain creekshell	T	
Pocketbook	Ē.		Mountain creeksneii		
	_				
Lasmigona compressa	E				
Creek heelsplitter					

Endangered, Threatened, Special Concern, and Historic Plants and Animals of Kentucky (July, 1997)

		ATUS		STA	TIIC	
	KSNPC	US		KSNPC	US	
Crustaceans			D			
			Dryobius sexnotatus	T		
Barbicambarus cornutus	S		Sixbanded longhorn beetle			
Bottlebrush crayfish	5		Litobrancha recurvata	S		
Bryocamptus morrisoni elegans	Т		A burrowing mayfly			
A copepod	•		Lordithon niger	H		
Caecidotea barri	Е		Black lordithon rove beetle			
Clifton Cave isopod	L		Lytrosis permagnaria	Ē		
Cambarellus puer	Е		A geometrid moth			
A dwarf crayfish	ند		Manophylax butleri	S		
Cambarellus shufeldtii	S		A limnephilid caddisfly			
Cajun dwarf crayfish	3		Nicrophorus americanus	T	LE	
Cambarus parvoculus			American burying beetle			
A crayfish	Е		Ophiogomphus howei	S		
Cambarus veteranus	-		Pygmy snaketail			
A crayfish	S		Papaipema eryngii	Ε		
Gammarus bousfieldi	_		Rattlesnake-master borer moth	_		
	Ε		Phyciodes batesii	T		
Bousfield's amphipod Aacrobrachium ohione			Tawny crescent	•		
	Ε		Pseudanophthalmus abditus	Т		
Ohio shrimp			Concealed cave beetle	•		
Prconectes australis	T		Pseudanophthalmus audax	Т		
A crayfish			Bold cave beetle	1		
rconectes bisectus	T		Pseudanophthalmus caecus	T		
Crittenden crayfish			Clifton Cave beetle	1		
rconectes inermis	S		Pseudanophthalmus calcareus	Т		
A crayfish			Limestone Cave beetle	1		
rconectes jeffersoni	E		Pseudanophthalmus catoryctos	E		
Louisville crayfish			Lesser Adams Cave beetle	E		
rconectes lancifer	Ε		Pseudanophthalmus conditus	T		
A crayfish			Hidden cave beetle	Т		
rconectes palmeri	Ε		Pseudanophthalmus exoticus			
A crayfish			Exotic cave beetle	Н		
rconectes pellucidus	S		Pseudanophthalmus frigidus	_		
A crayfish	-			T		
ilaemonias ganteri	E	LE	Icebox Cave beetle	_		
Mammoth Cave shrimp	_	UL.	Pseudanophthalmus globiceps	T		
ocambarus viaeviridis	T		Round-headed cave beetle			
A crayfish	•		Pseudanophthalmus horni	S		
gobromus vitreus	S		Garman's cave beetle			
An amphipod	J		Pseudanophthalmus hypolithos	Т		
. 1			Ashcamp cave beetle			
sects			Pseudanophthalmus inexpectatus	T		
			Suprising cave beetle			ġ
lithemis verna			Pseudanophthalmus major	T		•
Double-ringed pennant	S		Beaver Cave beetle			
eumatopsyche helma			Pseudanophthalmus parvus	T		
Helma's net-spinning caddisfly	Н		Tatum Cave beetle			

	STATUS		STAT	rus
	KSNPC US		KSNPC	US
Pseudanophthalmus pholeter	E	r · · · · · · ·	_	
Greater Adams Cave beetle	E	Erimystax insignis	E	
Pseudanophthalmus pubescens intrepidus	Т	Blotched chub		
A cave beetle	1	Erimyzon sucetta	T	
	*	Lake chubsucker		
Pseudanophthalmus puteanus	Ť	Esox niger	S	
Old Well Cave beetle	_	Chain pickerel		
Pseudanophthalmus rogersae	T	Etheostoma chienense	E	LE
Rogers' cave beetle		Relict darter		
Pseudanophthalmus scholasticus	Τ	Etheostoma cinereum	S	
Scholarly Cave beetle		Ashy darter		
Pseudanophthalmus simulans	T	Etheostoma fusiforme	E	
Cub Run Cave beetle		Swamp darter		
Pseudanophthalmus tenebrosus	T	Etheostoma lynceum	S	
Stevens Creek Cave beetle		Brighteye darter	5	
Pseudanophthalmus troglodytes	Т	Etheostoma maculatum	Т	
Louisville cave beetle		Spotted darter	1	
Pyrgus wyandot	T	Etheostoma microlepidum	Ė	
Appalachian grizzled skipper	•	Smallscale darter	E	
Speyeria idalia	Н	Etheostoma nigrum susanae	~ · · · · ·	
Regal fritillary	• •	=	Τ	
Stenonema bednariki	S	Johnny darter	6	
A heptageniid mayfly	3	Etheostoma parvipinne	S	
Stylurus notatus	Н	Goldstripe darter	_	
Elusive clubtail	П	Etheostoma percnurum	E	LE
Etasive clabian		Duskytail darter		
Eighag		Etheostoma proeliare	τ	
Fishes		Cypress darter		
		Etheostoma pyrrhogaster	S	
Acipenser fulvescens	E	Firebelly darter		
Lake sturgeon		Etheostoma sagitta spilotum	S-	
Alosa alabamae	Ε	Arrow darter		
Alabama shad		Etheostoma swaini	S	
Amblyopsis spelaea	S	Gulf darter		
Northern cavefish		Fundulus chrysotus	Ε	
Ammocrypia clara	E	Golden topminnow		
Western sand darter		Fundulus dispar	E	
Ammocrypta pellucida	S	Starhead topminnow	_	
Eastern sand darter		Hybognathus hayi	E	
Atractosteus spatula	Ē	Cypress minnow	L	
Alligator gar	_	Hybognathus placitus	S	
Clinostomus funduloides	S	Plains minnow	ತ	
Rosyside dace	J		7.1	
Cyprinella camura	S	Hybopsis amnis Pallid shiner	Н	
Bluntface shiner	S		-	
Cyprinella venusta	c	Ichthyomyzon castaneus	S	
···	S	Chestnut lamprey		
Blacktail shiner		Ichthyomyzon fossor	T	
		Northern brook lamprey		

Endangered, Threatened, Special Concern, and Historic Plants and Animals of Kentucky (July, 1997)

	STA			STAT	ΓUS	
	KSNPC	US		KSNPC	US	
Ichthyomyzon gagei	Н		Phenacobius uranops	c		
Southern brook lamprey			Stargazing minnow	S		
Ichthyomyzon greeleyi	T		Phoxinus cumberlandensis	T	1 7	
Mountain brook lamprey			Blackside dace	T	LT	
Ictiobus niger	S		Platygobio gracilis	c		
Black buffalo			Flathead chub	S		
Lampetra appendix	Т		Rhinichthys cataractae	-		
American brook lamprey			Longnose dace	E		
Lepomis marginatus	E		Scaphirhynchus albus	1		
Dollar sunfish			Pallid sturgeon	E	LE	
Lepomis miniatus	T		Thoburnia atripinnis	c		
Redspotted sunfish			Blackfin sucker	S		
Lota lota	S		Typhlichthys subterraneus	~		
Burbot			Southern cavefish	S		
Macrhybopsis gelida	Н	С	Umbra limi	Т		
Sturgeon chub			Central mudminnow	1		
Macrhybopsis meeki	Н	С	Centar madminiow			
Sicklefin chub		_	Amphibians			
Menidia beryllina	T		Amphibians			
Inland silverside			Amphiuma tridactylum	-		
Moxostoma poecilurum	S		· · · · · · · · · · · · · · · · · · ·	E		
Blacktail redhorse	-		Three-toed Amphiuma	T		
Nocomis biguttatus	S		Eurycea longicauda guttolineata Three-lined Salamander	T		
Hornyhead chub	_		Hyla avivoca	T		
Notropis albizonatus	E	LE		T		
Palezone shiner	_		Bird-voiced Treefrog Hyla cinerea			
Notropis hudsonius	S			S		
Spottail shiner			Green Treefrog Hyla gratiosa	c		
Votropis maculatus	Т		Barking Treefrog	S		
Taillight shiner			Hyla versicolor	c		
V <i>otropis</i> sp.	Ε		Gray Treefrog	S		
Sawfm shiner (undescribed)			Plethodon cinereus	c		
Noturus exilis	E		Redback Salamander	S		
Slender madtom	_		Plethodon wehrlei	-		
Voturus hildebrandi	S		Wehrle's Salamander	E		
Least madtom	_		Rana areolata circulosa	~		
Noturus phaeus	S			S		
Brown madtom	_		Northern Crawfish Frog			
Voturus stigmosus	S		Rana pipiens	S		
Northern madtom	J		Northern Leopard Frog			
Percina macrocephala	Т		D 4:1			
Longhead darter	-		Reptiles			
Percina squamata	Е					
Ólive darter	_		Apalone mutica mutica	S		
Percopsis omiscomaycus	S		Midland Smooth Softshell	-		
Trout-perch	J		Chrysemys picta dorsalis	S		
. '			Southern Painted Turtle			

	,	STAT	rus		STAT	ΓUS
		KSNPC	US		KSNPC	US
•						
	Clonophis kirtlandii	Е		Ardea herodias	S	
	Kirtland's Snake			Great Blue Heron		
	Elaphe guttata guttata	S		Asio flammeus	E	
	Com Snake			Short-eared Owl		
- ;	Eumeces anthracinus anthracinus	T		Asio otus	E	
:	Northern Coal Skink			Long-eared Owl		
	Eumeces anthracinus pluvialis	E		Bartramia longicauda	Н	
	Southern Coal Skink			Upland Sandpiper		
	Eumeces inexpectatus	S		Botaurus lentiginosus	Н	
	Southeastern Five-lined Skink			American Bittern	*-	
	Farancia abacura reinwardtii	S		Bubulcus ibis	s	
==	Western Mud Snake		-	Cattle Egret	-	
	Lampropeltis triangulum elapsoides	S		Certhia americana .	E	
314	Scarlet Kingsnake	_		Brown Creeper	_	
	Macroclemys temminckii	Т	-	Chondestes grammacus	Т	
	Alligator Snapping Turtle	•		Lark Sparrow	•	
	Nerodia cyclopion	Е		Circus cyaneus	Ť	
	Mississippi Green Water Snake			Northern Harrier	1	
	Nerodia erythrogaster neglecta	S	PT	Cistothorus platensis	S	
	Copperbelly Water Snake	3	1.3	Sedge Wren	3	
	Nerodia fasciata confluens	Е		Corvus corax	Е	
	Broad-banded Water Snake	L		Common Raven	E	
	Ophisaurus attenuatus longicaudus	Т			c	
	Eastern Slender Glass Lizard	1		Corvus ossifragus	S	
		Т		Fish Crow	T	
	Pituophis melanoleucus melanoleucus Northern Pine Snake	1		<i>Dendroica fusca</i> Blackburnian Warbler	Т	
	Sistrurus miliarius streckeri	т			C	
		T		Dolichonyx oryzivorus	S	
	Western Pigmy Rattlesnake	~		Bobolink	_	
	Thamnophis proximus proximus	T		Egretta caerulea	E	
	Western Ribbon Snake	•		Little Blue Heron		
	Thamnophis sauritus sauritus	S		Empidonax minimus	Ĕ	
Į.	Eastern Ribbon Snake			Least Flycatcher		
				Fulica americana	Н	
	Birds			American Coot		
			•	Gallinula chloropus	T	
	Accipiter striatus	S		Common Moorhen		
	Sharp-shinned Hawk			Haliaeetus leucocephalus	E	LE
	Actitis macularia	E		Bald Eagle		
	Spotted Sandpiper			Ictinia mississippiensis	S	
	Aimophila aestivalis	E		Mississippi Kite		
	Bachman's Sparrow			Ixobrychus exilis	Т	
- T	Ammodramus henslowii	S		Least Bittern		
*	Henslow's Sparrow			Junco hyemalis	S	
	Anas discors	Ε		Dark-eyed Junco		
	Blue-winged Teal			Lophodytes cucullatus	T	
	Ardea alba	Е		Hooded Merganser		
	Great Egret			~		

Endangered, Threatened, Special Concern, and Historic Plants and Animals of Kentucky (July, 1997)

	STAT	rus		STAT	TUS	
	KSNPC	US		<u>KSNPC</u>	US	
Nyctanassa violacea	Т		N			
Yellow-crowned Night-Heron	,		Mammals			
Nycticorax nycticorax	т			_		
Black-crowned Night-Heron			Clethrionomys gapperi maurus	S		
Pandion haliaetus	Τ		Kentucky Red-backed Vole			
Osprey	1		Corynorhinus rafinesquii	T		
Passerculus sandwichensis	S		Rafinesque's Big-eared Bat			
Savannah Sparrow	3		Corynorhinus townsendii virginianus	E	LE	
Phalacrocorax auritus	Н		Virginia Big-eared Bat			
Double-crested Cormorant			Mustela nivalis	S		
Pheucicus ludovicianus	S		Least Weasel			
Rose-breasted Grosbeak	3		Myotis austroriparius	Ė		á
Picoides borealis	E	LE	Southeastern Myotis			Ē
Red-cockaded Woodpecker	E.	LE	Myotis grisescens	E	LE	ā
Podilymbus podiceps	Е		Gray Myotis			
Pied-billed Grebe	Б		Myotis leibii	E		
Pooecetes gramineus	E		Eastern Small-footed Myotis			
Vesper Sparrow	E		Myotis sodalis	E	LE	
Rallus elegans	E		Indiana Myotis			
King Rail	E		Nycticeius humeralis	T		
Ring Kan Riparia riparia	S		Evening Bat			
Bank Swallow	3		Peromyscus gossypinus	T		
Sterna antillarum athalassos	E	LĒ	Cotton Mouse			
Interior Least Tern	E	LE	Sorex cinereus	S		
Thryomanes bewickii	S		Masked Shrew			
Bewick's Wren	3		Sorex dispar blitchi	E		
Tyto alba	S		Long-tailed Shrew			
Barn Owl	S		Spilogale putorius	S		
Vermivora chrysoptera	Т		Eastern Spotted Skunk	_		
Golden-winged Warbler	1		Ursus americanus	S		
Vireo bellii	S		Black Bear			
Bell's Vireo	3					٤,
Wilsonia canadensis	S					
Canada Warbler	3					
Carlada Walbier			tuo Cotomorio			

Key to Status Categories

(KSNPC) Kentucky State Nature Preserves Commission

- E: Endangered. A taxon in danger of extirpation and/or extinction throughout all or a significant part of its range in Kentucky.
- T: Threatened. A taxon likely to become endangered within the foreseeable future throughout all or a significant part of its range in Kentucky.
- Special Concern. A taxon that should be monitored because (a) it exists in a limited geographic area, (b) it may become threatened or endangered due to modification or destruction of habitat, (c) certain characteristics or requirements make it especially vulnerable to specific pressures, (d) experienced researchers have identified other factors that may jeopardize it, or (e) it is thought to be rare or declining but insufficient information exists for assignment to the threatened or endangered status categories.
- H: Historic. A taxon documented from Kentucky but not observed reliably since 1975.

(US) Endangered Species Act of 1973

For status category definitions see:

United States Fish and Wildlife Service. 1992. Endangered Species Act of 1973 as amended through the 100th Congress. United States Government Printing Office, Washington, District of Columbia;

United States Fish and Wildlife Service. 1993. Endangered and threatened wildlife and plants; review of plant taxa for listing as endangered or threatened species. Federal Register 58:51144-51190; and

United States Fish and Wildlife Service. 1996. Endangered and threatened wildlife and plants; review of plant and animal taxa that are candidates for listing as endangered or threatened species. Federal Register 61:7596-7613.

US statuses were taken from:

United States Fish and Wildlife Service. 1996. Endangered and threatened wildlife and plants. United States Government Printing Office, Washington, District of Columbia;

United States Fish and Wildlife Service. 1996. Endangered and threatened wildlife and plants; review of plant and animal taxa that are candidates for listing as endangered or threatened species. Federal Register 61:7596-7613; and

United States Fish and Wildlife Service. 1997. Endangered and threatened wildlife and plants; determination of endangered status for the Cumberland elktoe, Oyster mussel, Cumberlandian combshell, Purple bean, and Rough rabbitsfoot. Federal Register 62:1647-1658.

LE: Listed Endangered

LT: Listed Threatened

PT: Proposed Threatened

C: Candidate

Kentucky State Nature Preserves Commission 801 Schenkel Lane Frankfort, KY 40601-1403 (502) 573-2886 phone (502) 573-2355 fax

7-52

Plants and Animals Presumed Extinct or Extirpated from Kentucky

Kentucky State Nature Preserves Commission July, 1997

	US STATUS		US STATUS	
PLANTS		Leptodea leptodon		
		Scaleshell		
Caltha palustris vat. palustris		Plethobasus cicatricosus	LE	
Marsh Marigold		White wartyback		
Orbexilum stipulatum	3A	Quadrula fragosa	LE	
Stipuled Scurf-pea		Winged mapleleaf		
hysostegia intermedia		Quadrula tuberosa		
Slender Dragon-head		Rough rockshell		
olytaenia nuttallii				
Prairie Parsley		Insects		
ANIMALS		Pentagenia robusta	3A	
		Robust pentagenian burrowing		
nionids (Mussels)		mayfly		
romus dromas	LE	Fishes		
Dromedary pearlymussel				
pioblasma arcaeformis	3A	Ammocrypta vivax		
Sugarspoon		Scaly sand darter		
pioblasma biemarginata	3A	Crystallaria asprella		
Angled riffleshell		Crystal darter		
pioblasma flexuosa	3A	Erimystax x-punctatus		
Leafshell		Gravel chub		
vioblasma florentina florentina	LE	Etheostoma microperca		
Yellow blossom		Least darter		
pioblasma florentina walkeri	LE	Hemitremia flammea		
Tan riffleshell	2.4	Flame chub		
pioblasma haysiana Acornshell	3A	Moxostoma lacerum		
pioblasma lewisii	2.4	Harelip sucker Moxostoma valenciennesi		
Forkshell	3A	Greater redhorse		
pioblasma obliquata perobliqua	LE	Percina burtoni		
White catspaw	LE ,	Blotchside logperch		
pioblasma personata	3A	Diotenside rogperen		
Round combshell	J13	Reptiles		
pioblasma propinqua	3A			
Tennessee riffleshell	J	Masticophis flagellum flagellum		
pioblasma sampsonii		Eastern Coachwhip		
Wabash riffleshell				
pioblasma stewardsoni	3A	Birds (* extirpated as nesting species)		
Cumberland leafshell		,		
pioblasma torulosa torulosa	LE	Anhinga anhinga		
Tubercied blossom		Anhinga		
emistena lata	LE	Campephilus principalis	LE	
Cracking pearlymussel		Ivory-billed Woodpecker	— ***	

	US STATUS		US
	314105		STATUS
Chlidonias niger * Black Tern		Mammals	
Carolina Parakeet		Bos bison American Bison	
Ectopistes migratorius Passenger Pigeon		Canis lupus Gray Wolf	LE
Elanoides forficatus forficatus Swallow-tailed Kite		Canis rufus Red Wolf	LE
Falco peregrinus * Peregrine Falcon	LE	Cervus elaphus Elk	
Tympanuchus cupido Greater Prairie-chicken		Felis concolor cougar Eastern Cougar	LE
<i>Vermivora bachmanii</i> Bachman's Warbler	LE	Dustern Cougal	

Key to Status Categories

(US) Endangered Species Act of 1973

For status category definitions see:

United States Fish and Wildlife Service. 1992. Endangered Species Act of 1973 as amended through the 100th Congress. United States Government Printing Office, Washington, District of Columbia; and

United States Fish and Wildlife Service. 1993. Plant taxa for listing as endangered or threatened species; notice of review. Federal Register 58:51144-51190.

US statuses were taken from:

United States Fish and Wildlife Service. 1989. Endangered and threatened wildlife and plants; animal notice of review. Federal Register 54:554-579;

United States Fish and Wildlife Service. 1993. Endangered and threatened wildlife and plants; review of plant taxa for listing as endangered or threatened species. Federal Register 58:51144-51190; and

.United States Fish and Wildlife Service. 1996. Endangered and threatened wildlife and plants. United States Government Printing Office, Washington, District of Columbia.

LE: Listed Endangered 3A: Considered extinct

> Kentucky State Nature Preserves Commission 801 Schenkel Lane Frankfort, KY 40601-1403 (502) 573-2886 phone (502) 573-2355 fax

Monitored Natural Communities of Kentucky

Kentucky State Nature Preserves Commission March, 1998

The Kentucky State Nature Preserves Commission monitors exemplary examples of the following natural communities. Exemplary natural communities are relatively undisturbed or have recovered sufficiently from previous disturbances and have the flora and fauna that represents, to the best of our knowledge, the natural communities that existed in Kentucky at the time of European colonization.

LACUSTRINE COMMUNITY

Floodplain lake

PALUSTRINE COMMUNITIES

Riparian forest Alluvial forest Floodplain ridge/terrace forest Bottomland hardwood forest Wet prairie Bottomland marsh Sinkhole/depression marsh Sinkhole/depression pond Floodplain slough Coastal plain slough Acid seep Calcareous seep Cretaceous hills forested acid seep Appalachian open acid seep Depression swamp Cypress/tupelo swamp Shrub swamp Bottomland hardwood swamp

RIVERINE COMMUNITIES

Sand bar Mud flat Typic gravel/cobble bar Cumberland plateau gravel/cobble bar

TERRESTRIAL COMMUNITIES

Deep soil mesophytic forest Acidic mesophytic forest Calcareous mesophytic forest Acidic sub-xeric forest Calcareous sub-xeric forest Xeric acidic forest Xeric calcareous forest Xerohydric flatwoods Appalachian mesophytic forest Appalachian sub-xeric forest Cumberland highlands forest Coastal plain mesophytic cane forest Bluegrass mesophytic cane forest Appalachian pine-oak forest Redcedar-oak forest Hemlock-mixed forest Virginia pine forest Siltstone/shale glade Limestone slope glade Limestone flat rock glade Dolomite glade Cumberland plateau sandstone glade Shawnee hills sandstone glade Sandstone prairie Limestone prairie Tallgrass prairie Sandstone barrens Shale barrens Limestone barrens Bluegrass savanna-woodland Pine savanna-woodland

Monitored Elements Reported From the Heath, Ky. and Joppa, III. Ky. Quadrangles Standard Occurrence Report

Page 1 of 4 3/15/89

Y 0 ...

	II		
НАВІТАТ	PRAIRIES AND OPEN WOODS ON SANDY SOIL.	PRARIES INCL. REMNANTS OF THIS FLORA ON ROADSIDES AND FIELDS 0	PRARIES INCL. REMNANTS OF THIS FLORA ON HOADSIDES AND FIELDS. A
DIRECTIONS	WEST KY WMA, RD AROUND NUCLEAR PLANT (DYKE RD).	WEST KENTUCKY WLDLIFE MANAGEMENT AREA BETWEEN SPRING BAYOU (BAYOU CREEK) AND ACID RD, CA 0.5 AIR MI NNW OF SPRING BAYOU CHURCH.	WEST KENTUCKY WILDLIFE MANAGEMENT AREA, ALONG BOTH SIDES OF UNINMED GRAYEL RD, CA OL AIR MI S OF SOUTH ACID RD (IAARGNUM 22) 3706:10N, B84925W), [MARGNUM 40, 3705:48N, B8495W), [MARGNUM 42] 3705:48N, B8495W), [MARGNUM 42, 3705:48N, B8495W), [MARGNUM 42, 3705:44N, B8495W), [MARGNUM 42, 3705:44N, B8495W),
EPA WATERBODY	370803N 884816W BAYOU CREEK BASIN	884947W BAYOU CHEEK BASIN	BM949W BAYOU CHEEK BASIN
LONG	884816W	884947W	BB4949W
LAŦ	370603N	370543N	370601N
7.5 MINUTE QUADRANGLE	НЕАТН, КҮ.	неатн, ку.	ዙጀለ ገት, ና ን .
COUNTY	McCracken	McCracken	МсСлескел
EOBANK		o	∢
PREC	ω.	w	w
LASTOBS	1997-05-11	1993-07	1993-07
USESA THEOL	>-		>
10898	w	-	- -
SHANK	G4G S3 ST4T 5	651? 52	G5T? \$2
ш ЭН Р ИК		8	હ
SCOMNAME	CREAM WILD INDIGO	COMPASS	OOMPASS PLANT
SNAME	INC. BATTISIA BRACTEATA	VAR ROBINSONII	KY SIEPHUM LACINIATUM VAR ROBINSONII
EOCODE	Postalar Plante	PDAST8L082/025/1	PD0A5T8L082*016*2*016*2*016*2*016*2*016*2*016*2*016*2*016*2*016*2*016*2*016*2*016*2*016*2*016*2*016*2*016*2*016*2*016*2*016*2*016*2*016*2*016*2*016*2*016*2*016*2*016*2*016*2*016*2*016*2*016*2*016*2*016*2*016*2*016*2*016*2*016*2*016*2*016*2*016*2*016*2*016*2*016*2*016*2*016*2*016*2*016*2*016*2*016*2*016*2*016*2*016*2*016*2*016*2*016*2*016*2*016*2*016*2*016*2*016*2*016*2*016*2*016*2*016*2*016*2*016*2*016*2*016*2*016*2*016*2*016*2*016*2*016*2*016*2*016*2*016*2*016*2*016*2*016*2*016*2*016*2*016*2*016*2*016*2*016*2*016*2*016*2*016*2*016*2*016*2*016*2*016*2*016*2*016*2*016*2*016*2*016*2*016*2*016*2*016*2*016*2*016*2*016*2*016*2*016*2*016*2*016*2*016*2*016*2*016*2*016*2*016*2*016*2*016*2*016*2*016*2*016*2*016*2*016*2*016*2*016*2*016*2*016*2*016*2*016*2*016*2*016*2*016*2*016*2*016*2*016*2*016*2*016*2*016*2*016*2*016*2*016*2*016*2*016*2*016*2*016*2*016*2*016*2*016*2*016*2*016*2*016*2*016*2*016*2*016*2*016*2*016*2*016*2*016*2*016*2*016*2*016*2*016*2*016*2*016*2*016*2*016*2*016*2*016*2*016*2*016*2*016*2*016*2*016*2*016*2*016*2*016*2*016*2*016*2*016*2*016*2*016*2*016*2*016*2*016*2*016*2*016*2*016*2*016*2*016*2*016*2*016*2*016*2*016*2*016*2*016*2*016*2*016*2*016*2*016*2*016*2*016*2*016*2*016*2*016*2*016*2*016*2*016*2*016*2*016*2*016*2*016*2*016*2*016*2*016*2*016*2*016*2*016*2*016*2*016*2*016*2*016*2*016*2*016*2*016*2*016*2*016*2*016*2*016*2*016*2*016*2*016*2*016*2*016*2*016*2*016*2*016*2*016*2*016*2*016*2*016*2*016*2*016*2*016*2*016*2*016*2*016*2*016*2*016*2*016*2*016*2*016*2*016*2*016*2*016*2*016*2*016*2*016*2*016*2*016*2*016*2*016*2*016*2*016*2*016*2*016*2*016*2*016*2*016*2*016*2*016*2*016*2*016*2*016*2*016*2*016*2*016*2*016*2*016*2*016*2*016*2*016*2*016*2*016*2*016*2*016*2*016*2*016*2*016*2*016*2*016*2*016*2*016*2*016*2*016*2*016*2*016*2*016*2*016*2*016*2*016*2*016*2*016*2*016*2*016*2*016*2*016*2*016*2*016*2*016*2*016*2*016*2*016*2*016*2*016*2*016*2*016*2*016*2*016*2*016*2*016*2*016*2*016*2*016*2*016*2*016*2*016*2*016*2*016*2*016*2*016*2*016*2*016*2*016*2*016*2*016*016*2*016*2*016*2*016*2*016*2*016*2*016*2*016*2*016*2*01

Page 2 of 4. 3/16/99

Slandard Occurrence Report Monitored Elements Reported From the Heath, Ky. and Joppa, III.-Ky. Quadrangles

навітат	PRAIRIES INCL. REMANNIS OF THIS FLUHA UN S. ROADSIDES AND FIELDS. M., W., W., W., M. S. GULF E. OF E. OF		FEAM RESERVOIRS AND MEDIUM TO LARGE RIVERS WITH MODERATE TO LOW GRADIENT AND SOMETIME SWIFT CURRENT (BECKER 1983. PELJEGER 1975, SMITH 1979, TRAUTMAN 1981. AND BURR AND WARREN 1986)	LITLE BAYOU CK AT KY 358 (SITE 12), OCCURS IN WELL VEGETATED SWAMPS. SLOUGHS, BOTTOMLAND LAKES, AND LOW GRADIENT STREAMS (BURR AND NAYDEN 1979 PFLEGER 1975, SMITH 1973, BURRA AND WARREN 1986, ETNIER AND STARNES 1993).	WEST KENTUCKY WILDLIFE BREEDS IN PONDS IN FARMLAND AND EDGE. MANAGEMENT AREA, CA D.G. P.D. M. PEMAINS LINDERGROUND THROUGHOUT MOST OF SW OF JCT KY 938 AND KY 338, CA THE VEAR, USING GRAYFISH BURROWS IN WOIST SW OF AREA OFFICE (LODGE).
DIRECTIONS	WEST KENTUCKY WILD'LIFE MANAGEMENT AREA, NOF KY 725 BETWEEN KY 726 AND KY 1154 (MARGNUM 34, 370503N, 884838W). (MARGNUM 35, 370513N, 884838W). (MARGNUM 36, 370513N, 884838W). (MARGNUM 36, 370513N, 884918W). JCT OF MAGRUDER RD AND ILL GULF CENTFAL RR TRACKS (MARGNUM 22). S SIDE OF KY 725, CA 0.3 RD MI E OF KY 1154 (MARGNUM 39, 370513N, 884913W).		BIG BAYOU CREEK (CA. 0.4 STREAM KM. S. OF WEST BOONE RD CROSSING).		
EPA WATERBODY	BAYOU CREEK BASIN		BAYOU CREEK BASIN	4 BAYOU CREEK BASIN	N BAYOU CREEK BASIN
LONG	884859W		884928W	884710W	884917W
Ŗ	370503N		370736N	370650N	370750N
7.5 MINUTE QUADRANGLE	неатн, кү.		JOPPA, ILL-KY.	нЕАТН, КУ.	JOPPA, ILL-KY.
COUNTY	McGracken		McCracken	McCracken	McCracken
ОВРИК ВЕС	3 <u></u>		Ω Ø	a s	ა თ
E LASTOBS	1933-07		Y 1997-03	E0-1997-03	Y 1991-03-18
SESA	· ·		v	F	νn
Н РИК ЗИВ	25 C		SS SS	GS S2	6414 53
S S S S S S S S S S S S S S S S S S S	COMPASS		BLACK BUFFALO	REDSPOTTED (SUNFISH	NORTHERN CRAWFISH FROG
u 4 20	SILPHUM LACINATUM		ICTIOBUS NIGER	LEPOMIS MINIATUS	RÀNA AREOLATA CIRCULOSA
	POASTRIORZ'018'KY	7-58	Fishes AFCJC3793C'027'KY	AFC0B11128'032'KY	****Ampkiblans AAABHUIO14"014"KY

Standard Occurrence Report Mornitored Elements Reported From the Heath, Ky. and Joppa, III.-Ky. Quadrangles

Page 3 of 4

		D EDGE OUT MOST OF VS IN MOIST	D EDGE OUT MOST OF WS IN MCIST) EDGE. DUT MOST OF VS IN MOIST			EDGE. OUT MOST OF VS IN MOIST
	HABITAT	BREDSI IN FONDS IN FARMLAND AND EDGE FEMANIS UNDERGROUND THROUGHOUT MOST OF THE YEAR, USING CRAYFISH BURROWS IN MOIST GRASSLANDS AND MEADOWS.	BREEDS IN PONDS IN FARMLAND AND EDGE REMAINS UNDERGROUND THROUGHOUT MOST OF THE YEAR, USING CRAYFISH BURROWS IN MOIST GRASSLANDS AND MEADOWS.	BREEDS IN PONDS IN FARMLAND AND EDGE. REMANS UNDERGROUND THROUGHOUT WOST OF THE YEAR, USING CRAYFISH BURROWS IN MOIST GRASSLANDS AND MEADOWS.			WEST KENTUCKY WILDLIFE BHEEDS IN PONDS IN FARMLAND AND EDGE. MANAGEMENT AREA, CA D. I RD MI REMAINS UNDERGROUND THROUGHOUT WOST OF NW OF JCT KY 358 AND KY 955, DOWN THE YEAR USING CRAYFISH BURROWS IN MOIST ROAD JUST SE FOLODGE (MARRAWUM GRASSLANDS AND MEADOWS. 356, AND CA, 0.15 RD MI NW OF JCT KY 358 AND KY 955, DOWN RD JUST SE OF LODGE (MARRAWUM 39).
	DIRECTIONS	CRICA 0.4 ARÍ MI NW OF SPRING BAYOU CHURCH ON KY 725 (MARGNUM 11), CA 0.7 RD MI W OF SPRING BAYOU CHURCH ON KY 725 ON N SIOE OF RD (MARGNUM 12, 370524N, 885030W).	WEST KENTUCKY WILDUFE MANAGEMENT AREA, N. SIDE WATER WORKS RD JUST W OF FILTRATION PLANT.	WEST KENTUCKY WILDLIFE MANAGEMENT AREA, CA 0.3 RD MI NNW JCT KY 358 AND OGDEN LANDING RD (MARGNUM 14), WEST	A V WAS CALLAID MY JULY 17 998 AND KY 356 ON N SIDE KY 358 (MARGNUM 15, 370723N, 884736W), WEST KY WAKA, 15, FD MI W OF JCT KY 396 AND KY 358, 0.15 AHB MI S OF KY 366 (MARGNUM 16, 370718N, 884755W), WEST KY WAKA, CA. 1.7 RD MI W OF JCT KY 388 AND KY 996, CA. MI W OF JCT KY 388 AND KY 996, CA. MI W OF JCT KY 388 AND KY 996, CA. MI W OF JCT KY 388 AND KY 996, CA. MI W OF JCT KY 388 AND KY 996, CA. MI W OF JCT KY 388 AND KY 996, CA. MI W OF JCT KY 388 AND KY 996, CA. MI W OF JCT KY 388 AND KY 996, CA. MI W OF JCT KY 388 AND KY 996, CA. MI W OF JCT KY 388 AND KY 996, CA. MI W OF JCT KY 388 AND KY 996, CA. MI W OF JCT KY 388 AND KY 996, CA. MI W OF JCT KY 388 AND KY 996, CA. MI W OF JCT KY 388 AND KY 996, CA. MI W OF JCT KY 388 AND KY 996, CA. MI W OF JCT KY 388 AND KY 996, CA. MI W OF JCT KY 388 AND KY 996, CA. MI W OF JCT KY 388 AND KY 996, CA. MI W OF JCT KY 388 AND KY 996, CA. MI W OF JCT KY 388 AND KY 996, CA. MI W OF JCT KY 388 AND KY 996, CA. MI W OF JCT KY 388 AND KY 996, CA. MI W OF JCT KY 388 AND KY 996, CA. MI W OF JCT KY 388 AND KY 996, CA. MI W OF JCT KY 388 AND KY 996, CA. MI W OF JCT KY 388 AND KY 996, CA. MI W OF JCT KY 388 AND KY 996, CA. MI W OF JCT KY 388 AND KY 996, CA. MI W OF JCT KY 388 AND KY 996, CA. MI W OF JCT KY 388 AND KY 996, CA. MI W OF JCT KY 388 AND KY 996, CA. MI W OF JCT KY 388 AND KY 996, CA. MI W OF JCT KY 388 AND KY 996, CA. MI W OF JCT KY 388 AND KY 996, CA. MI W OF JCT KY 388 AND KY 996, CA. MI W OF JCT KY 388 AND KY 996, CA. MI W OF JCT KY 388 AND KY 996, CA. MI W OF JCT KY 388 AND KY 998 CA. MI W OF JCT KY 388 AND KY 998 CA. MI W OF JCT KY 388 AND KY 998 CA. MI W OF JCT KY 388 AND KY 998 CA. MI W OF JCT KY 388 AND KY 998 CA. MI W OF JCT KY 998 AND KY 998 CA. MI W OF JCT KY 998 CA. M	17, 370725N, 884805W).	WEST KENTUCKY WILDLIFE MANAGEMENT AREA, CA 0.1 RD MI NW OF JCT KY 388 AND KY 995, DOWN THE YEAR USING CRAYFISH B. ROAD JUST SE OF LODGE (MARGNUM GRASSLANDS AND MEADOWS, 36, AND CA 0.15 BD MAINW OF JCT KY 358 AND KY 995, DOWN RD JUST SE OF LODGE (MARGNUM 39)
buadrangles	EPA WATERBODY	BAYOU CREEK BASIN	BAYOU CREEK BASIN	BAYOU CHEEK BASIN			BAYOU CREEK BASIN
Report its pa, IIKy. C	LONG	885002W	884944W	884728W			884845W
Standard Occumence Report Monitored Elements he Heath, Ky. and Joppa, III	LAT	370530N	370648N	370710N			370757N
Standard Occurrence Report Monitored Elements Reported From the Heath, Ky, and Joppa, IIIKy, Ouadrangles	7.5 MINUTE QUADRANGLE	нЕАТН, КҮ.	нЕатн, кү.	нЕАТН, КҮ.			JOPPA, ILL-KY.
<u></u>	COUNTY	McCracken	McCracken	McCracken			McCracken
	EOBANK		∑	<u>ع</u> ن			Σ ∪
	ν γ	ဟ	Ø	S			w
	LASTOBS	1981-03-20	Y 1991-03-18	1991-03-20			Y 1998-02-27
	TNBOI	Y 198	≻	≻ 96			
	SPROT USESA		છ	co.			
	PRANK	G474 S3					S S
	li li	GAT	G414 S3	G414 S3			G474 S3
	SCOMNAME	NORTHERN CAAWFISH FROG	NORTHERN CRAWFISH FROG	NORTHERN CRAWFISH FROG			NORTHERN CRAWFISH FROG
	SNANE	RANA AREOLATA CIRCULOSA	RANA AREGLATA CIRCULOSA	RANA AREOLATA CIRCULOSA			. RANA AREOLATA CIRCULOSA
2016/98	EOCODE	AAABHOTO14°000PYRT	-MABH 01014*009*NY:	AAABHO1014-010-KN	7-59		AAABHOO I YO ISSYK HANA AREOLATA CIRCULOSA

...Birds

EOCODE

BAYOU CREEK BASIN 884905W

OFTEN MEAR WATER (883COMOTIVA); MOIST WOODLAND, BOTTONLANDS, WOODLAND EDGE. SCATTERED COVER AND HEDGEROWS IN CLITIVATED AREAS, OPEN WOODLAND, BRUSH IN WHT.

37073SN

12 Records Processed.



Education, Arts and Humanities Cabinet

KENTUCKY HERITAGE COUNCIL

The State Historic Preservation Office

David L. Morgan Executive Director and SHPO

Paul E. Patton Governor Roy Peterson Cabinet Secretary

April 6, 1999

Mr. Ray T. Moore DOE ORO Cultural Resources Management Coordinator Department of Energy Oak Ridge Operations Office P.O. Box 2001 Oak Ridge, Tennessee 37831

Proposed Receipt and Storage of Uranium Materials from the Re:

Fernald Environmental Project

Paducah Gaseous Diffusion Plant, McCracken County, Kentucky

Dear Mr. Moore:

Thank you for your letter concerning the above referenced project. Our review of this project indicates that it will have no effect on any property listed in or eligible for listing in the National Register of Historic Places. Therefore, I have no objections.

If you have any questions concerning this project please feel free to contact David Pollack of my staff at 502-564-7005.

> Sincerely, David L. Magan

David L. Morgan, Director Kennucky Heritage Council and

State Historic Preservation Officer

300 Washington Street Frankfort, Kentucky 40601 An equal opportunity employer M/F/D



Ohio Historic Preservation Office

567 East Hudson Street Columbus, Ohio 43211-1030 614/ 297-2470 Fax: 614/ 297-2496

Visit us at www.ohiotiistory.org/resource/histpres/

April 5, 1999



Ray T. Moore
DOE ORO Cultural Resources
Department of Energy, Oak Ridge
P.O. Box 2001
Oak Ridge, TN 37831

Re:

Storage of Uranium Materials from Fernald Portsmouth Gaseous Diffusion Plant, Pike County, Ohio

Dear Mr. Moore,

This is in response to correspondence from your office dated March 9, 1999 (received March 10) regarding the above referenced project. The comments of the Ohio Historic Preservation Office (OHPO) are submitted in accordance with provisions of the National Historic Preservation Act of 1966, as amended (16 U.S.C. 470 [36 CFR 800]).

Portsmouth Gaseous Diffusion Plant is being considered as one alternative to receive and store uranium materials from Fernald. The materials would be stored within existing facilities or within one or two specially constructed structures. It is our understanding that the use of existing structures will not require alterations or modifications of qualities or characteristics that give significance to this facility. The proposed new structures, if needed, are of small scale relative to other structures within the facility and would be located in an area where there has been previous construction. Based on the information presented in your correspondence, we concur with your assessment that the proposed project will have no effect on any property that is eligible for inclusion or included in the National Register of Historic Places. The finding of no effect ends the requirement for consultation with this office for this project. If changes in the scope of work could result in changes or modifications that would have an effect, even if the effect is not considered to be adverse, then further coordination with this office is recommended.

Any questions concerning this matter should be addressed to David Snyder at (614) 297-2470, between the hours of 8 am. to 5 pm. Thank you for your cooperation.

Sincerely,

David Snyder, Archaeology Reviews Manager

Resource Protection and Review

DM/S/ds

xe: DeWintus Perkins, U.S. Department of Energy, Portsmouth Site Office, P.O. Box 700, Piketon, OH 45661-0700

APPENDIX A

DOE-FEMP NEPA COVERAGE FOR DISPOSITION OF NUCLEAR MATERIAL INVENTORY

APPENDIX A. DOE-FEMP NEPA COVERAGE FOR DISPOSITION OF NUCLEAR MATERIAL INVENTORY

This appendix is provided to demonstrate that the analysis for packaging and transportation of FEMP uranium materials was included in previous NEPA and other environmental evaluations.

The Department of Energy - Fernald Environmental Management Project (DOE-FEMP) has addressed compliance with the National Environmental Policy Act for disposition of nuclear material from the Fernald Site to off-site locations pursuant to DOE's NEPA Implementing Regulations at 10 CFR 1021. The disposition of nuclear material inventories from the Fernald Site was initiated as part of Removal Actions #12, Safe Shutdown of the former production facilities at the FEMP. DOE determined that the implementation of the Safe Shutdown Removal Action (including material disposition) was excluded from requiring a detailed NEPA evaluation (e.g., an Environmental Assessment).

In 1994, DOE-FEMP developed an integrated Proposed Plan-Environmental Assessment (PP-EA) that identified the dismantling and decontamination of all structures contained within Operable Unit (OU) 3 as an appropriate Interim Remedial Action at the FEMP. The PP-EA followed the process required by 10 CFR 1021 for preparation of Environmental Assessments, including public involvement. The PP-EA identified a number of removal actions that required completion as part of the remediation of Operable Unit 3. One of the removal actions was the Safe Shutdown which included the disposition of nuclear materials from the FEMP to off-site receptors. The public was provided an opportunity to comment on the PP/EA during the public review period held in 1994. An Interim Record of Decision² was approved in July of 1994 for implementation of the Interim Remedial Action after completion of the public involvement process.

In 1996, DOE-FEMP developed an Integrated Remedial Investigation/Feasibility Study which evaluated the appropriate final remedial action for Operable Unit 3. Pursuant to DOE's revised policy statement on NEPA issued in June, 1994, NEPA values were incorporated into the Integrated RI/FS and the public involvement process pursuant to CERCLA was followed. The integrated RI/FS did not reconsider decisions made in previous documents (e.g., OU 3 IROD), but it once again identified the Removal Actions (including Safe Shutdown) that required completion as part of the remediation of OU 3. The final ROD³ for OU 3 was approved in September of 1996 after completion of the public involvement process.

The disposition of nuclear materials is a fundamental component of the CERCLA actions being conducted at the FEMP. The DOE's NEPA Implementing Regulations consider transportation as an activity that is necessary and included within the scope of CERCLA Removal Actions. All material shipped from the FEMP will be packaged in accordance with Title 49 Code of Federal Regulations. Although DOE excludes CERCLA Removal Actions from requiring detailed NEPA documentation, two separate integrated CERCLA/NEPA processes (with full public involvement) were carried out at the FEMP which identified the disposition of nuclear material as a fundamental component of the remediation of OU 3. The documents referenced above are available in the Fernald Public Environmental Information Center at (513) 648-7480.

The outbound shipments from ORO will move in DOE approved packaging, subject to DOE radiation, contamination or fissile controls and other DOE Federal or State requirements.

- 1. Letter; Kim Hayes to Thomas Rowland, April 12, 1993; subject: Safe Shutdown Environmental Assessment.
- June 1994; Operable Unit 3 Record of Decision for Interim Remedial Action. Fernald Environmental Management Project, Fernald Ohio.
- 3. August 1996; Operable Unit 3 Record of Decision for Final Remedial Action. Fernald Environmental Management Project, Fernald Ohio.

APPENDIX B

FEMP URANIUM INVENTORY PROPOSED TO BE MOVED TO OTHER DOE SITE(S)

Potential Movement of FEMP Uranium to Other DOE Site(s)

0.030	14 Blend Stock
lements 0.030 0.041	
0.041	
	19 Blend Stock
Recycle Pieces 0.353 156	156 Blend Stock
Total Metal 0.424 189	189
UF_4 0.010 4	4 Blend Stock
Total All Normal 0.434 193	193

^{*}Metric Tons Uranium

WAREHOUSE SPACE REQUIRE	REQUIREMENTS	MENTS FOR NORMAL URANIUM	UM Cochioco		NO CN		
DESCRIPTION/ TOTAL NET.LBS.	CONTAINER COUNT (AS STORED)	ASSUMED PACKAGING	NO.OF PKGS. (AS SHPD)	COMMENT	FINISHED UNITS ON FLOOR	SO.FT. EACH	TOTAL SQ.FT.
PRIMARY INGOTS 112,956	16 SKIDS	STRONG/TIGHT G4273-5 OR 6 WOODEN BOX		PACK 2/BOX STACKED 5 HIGH	<u> 4</u> -	ω	136
PRODUCT INGOTS 40,979	7 SKIDS	STRONG/FIGHT G4273-5 OR 6 WOODEN BOX		PACK IN BOXES STACKED 5 HIGH	- 		
DERBIES 8,384	3 SKIDS	STRONG/TIGHT G4214 WOODEN BOX	5	PACK IN BOXES STACKED 5 HIGH	es	4	12
CORES 30,633	51 DRUMS	STRONG/TIGHT DRUMS		SHIP AS IS IN DRUMS PALLETIZED 4/PALLET STACKED 3 HIGH			
CLAD METAL 60,239	77 DRUMS	STRONG/TIGHT DRUMS	350	PALLETIZE . 4/PALLET, STACK ED 3 HIGH	F	16	480
RECYCLE METAL 169,239	222 VARIOUS	STRONG/TIGHT DRUMS		1000 LBS./BOX STACKED 3 HIGH	, 		

20 TOTAL UNITS ON FLOOR $^{\circ}$ For the wooden boxes, the assumptions are within the guidelines of the Safety Analysis Report NLCO-1107, Rev. 1., which allows stacking the boxes five (5) high. 445 TOTAL PACKAGES AS SHIPPED TOTAL NET LBS.: 422,430

B-4

Potential Movement of FEMP Uranium to Other DOE Site(s)

Depleted Uranium	Pounds (millions)	MTU*	Justification for Movement
Metal:			
Fuel Elements	1.331	604	Shielding
Ingots	1.505	683	Shielding
Recycle Pieces	0.108	50	Shielding
Total Metal	2.944	1,337	
UF_4	4.141	1,424	Army Use
Total All Depleted	7.085	2,761	

*Metric Tons Uranium

ESTIMATED WAREHOUSE SPACE REQUIREMENTS FOR PIPOPONT	TOUSE SPACE REQ		PLETED ONAN REQUIRED NO OF	DEFLETED ORANIOM - MAT VANT DETENDING OF ON THACK FACING DECINIONS NO.OF NO.OF FINISHED		NO.OF FINISHED		
DESCRIPTION/ TOTAL NET.LBS.	COUNT (AS STORED)	ASSUMED PACKAGING	PKGS. (AS SHPD)	COMMENT	AISLE SPACING 3' ON ALL SIDES	UNITS ON FLOOR	SQ.FT. EACH	TOTAL SQ.FT. 2157
UF4 4,141,234	14490 10-G	TOC METAL BOX (~9000 LBS/BOX)	483	TOC BOXES STACKED 3 HIGH = 170 STACKS/4 ROWS	(ASSUMES BACK- TO-BACK PKGS, AISLES EVERY 2	161	33	5313
	64 T-H	"AS IS" (~14000 LBS/EA)	547	DOUBLE-STACKED		193	91	512 7982
	:		!		3' ON ALL SIDES	!	;	810
PRIMARY INGOTS 735,531	138 WMB	STRONG/TIGHT METAL BOX (~9000 LBS/EA)	138	HALF-HIGH METAL STACKED 3 HIGH 46 STACKS/2 ROWS	(ASSUMES BACK- TO-BACK PKGS)	46	ဗ	1518 2328
PRODUCT INGOTS 769,820	107 WMB	STRONG/TIGHT METAL BOX (~9000 LBS/EA)	107	HALF-HIGH METAL STACKED 3 HIGH 36 STACKS/2 ROWS	3' ON ALL SIDES (ASSUMES BACK- TO-BACK PKGS)	990	33	550 1188 1848
CORES 1,329,318	1512 WOODEN BOXES	STRONG/TIGHT METAL BOX (~9000 LBS/EA)	222	ASSUMED 6000 LBS./BOX STACKED 3 HIGH 74 STACKS/2 ROWS	3' ON ALL SIDES (ASSUMES BACK- TO-BACK PKGS)	74	33	2230 2442 4672
RECYCLE METAL 109,410	122 VARIOUS	TOC METAL BOX (~9000 LBS/EA)	18	ASSUMED 6000 LBS./BOX STACKED 3 HIGH 6 STACKS/1 ROW	3' ON ALL SIDES (ASSUMES BACK- TO-BACK PKGS)	.	33	141 198 339
TOTAL NET LBS.: 7,085,313 MTC - Material Description Code G - Gallon LSA - Low Specific Activity (Shipping designation) T-H - T-hopper. TOC - Thorium Overpack Container	ription Code	TOTAL PACKAGES AS SHIPPED gnation)	1032	·		GRAND TOTAL	75	17169

Potential Movement of FEMP Uranium to Other DOE Site(s)

i walio

Low Enriched Uranium	Pounds (millions)	MTU*	Justification for Movement
Miscellaneous UO ₂	900.0	2.5	Recovery
Miscellaneous Metals,	1.555	540.0	Interim Storage
Oxides, Compounds (commercial sale)			
UO ₃ and Derbies	0.644	256.0	Interim Storage
(Programmatic Use)	2.205	798.5	
*Metric Tons Uranium			

			REQUIR	ED NO.	EST.	\$Q.FT. E	ESTIMATED TOTAL
OESCRIPTION (QUANTITY (NET LBS.)	QUANTITY (MTU)*	PLANNED PACKAGING	OF PACKAGES (AS SHIPPED)	TRUCKS/ PKGS/TRK	Ħ	\$Q.FT.
	432.887	162	BU-J 196 lbs/net 450 lbs./gross	2208	31 TRKS 72 PKGS	AISLE SPACING (4 DRUMS/PALLET) STACKED 4 HIGH	1404
0.72 - 1.0% U238 U308 Oxide	709,433	222	55-GALLON DRUM 880 lbs. net ea. -930 lbs./gross	8	25 TRKS 32 PKGS#	16 AISLE SPACING (INCLWITH ITEM 3) (4 DRUMS/PALLET) STACKED 4 HIGH	90 60
51% U235 U308 OXIDE	240,021	23	8U-J 196 lbs/net 450 lbs/gross	1224	17 TRKS 72 PKGS	16 AISLE SPACING (4 DRUMS/PALLET) STACKED 4 HIGH	1224 1380
0.72 - 1.00% U238 UF4	18,344		\$5-GALLON DRUM 880 lbs. net es. -830 lbs./gross	9	0.5 TRKS	.	9
1.0 - 2.0% UZ3\$ UF4 COMPOUND	112,910	80	30-GALLON INNER 55-GALLON OUTER -75 bunet (350gU235) -928 bisgness	1,744	24 TRKS 72 PKGS**	16 ASLE SPACING (4 DRUMS/PALLET) STACKED 4 HIGH	1744
1.25% U235 PRIMAŘY INGOTS METAL	42,788	50	WOODEN BOX 1 PER BOX ~2000 (bs/met	23	3 TRKS 9 PKGS**	7.28 STACKED 5 HIGH	37
1.25% U235 PRODUCT INGOTS METAL	5,094	2	-2000 lbs/net	n	PARTIAL	7.28 STACKED 5 HIGH	22
41% U235 CLAD METAL	91,724	28	WOODEN BOX ~1252 lbs/nel ~1332 lbs/gross	49	7 TRKS	7.28 STACKED 5 HIGH	38
1% U235 CLAD METAL	7,302	4	WOODEN BOX -1252 lbs/net 1332 lbs/gross	•	1 TRK	3.92 STACKED 5 HIGH	
1.25% U235 DERBY METAL 1.25% U235 RECYCLE METAL	208,288	10	WOODEN BOX 600 lbs/net 600 lbs/grass WOODEN BOX ~1252 lbs/net	119	15 TRKS 24 PKGS 17 TRKS 7 PKGS	3.92 STACKED 5 HIGH 3.92	278
0.95% U235 RECYCLE METAL	180,883	82	-1332 lbs/gross WOODEN BOX -1252 lbs/net -1332 lbs/gross		-	3.92 STACKED 5 HIGH	7
1.0 - 19.9% U235 UO2	6,413	2	•	176	1 TRKS	AISLE SPACKING	424
TOTAL	2,172,729	662		6,678	164 TRKS	AISLE SPACING FOR ITEMS 6 - 12	1302 12469

B-8

ASSUMED PACKAGING FOR URANIUM STORAGE

		Gross Weight,	
Container Type	Outside Dimensions	lb/container	Description
T-Hopper	~6 ft long × 4 ft wide	14,000	Steel, cone-bottom container with bolted openings on opposite ends, enclosed in a steel frame.
Thorium Overpack Container	83 in. $long \times 56.5$ in. wide $\times 46$ in. high	000'6	Steel box, certified to pass 4-ft drop test, equipped with lifting straps on lid and interior plywood inserts that allow several layers of drums or cans to be placed inside the box.
Strong, tight metal boxes	83.5 in. long \times 47.5 in. wide \times :	Depends on size	Steel boxes with wood shoring between stored items to prevent contact and shifting; steel lids secured with locks; equipped with
Full sizeHalf-high	44.5 in. high20.5 in. high		lifting straps on lid.
Strong, tight wooden box	Variety of sizes	Variety of capacities	Wooden boxes strengthened with horizontal and vertical steel bands. There are two types: a box with a cover and a pallet with an inverted box as the cover. The steel bands are closed with notched seals. All wood boxes are mounted on two or three wooden skids to allow handling via forklifts.
Strong, tight metal drums • 55-gal	• 24 in. diam × 34 in. high	930	Steel drums with tops secured by locking rings.
• 30-gal inner, 55-gal outer	• 20 in. diam × 28.5 in. high	930 (350 g U-235 limit)	
Sea-land containers	Variety of sizes	Variety of capacities	Designed as an overpack container to be used for storing wooden boxes after they are received at the storage location in order to protect them from rain or water inleakage.

APPENDIX C RELEASE ASSUMPTIONS AND ACCIDENT MODELING RESULTS

APPENDIX C. RELEASE ASSUMPTIONS AND ACCIDENT MODELING RESULTS

C.1 PUBLIC AND WORKER RISK

This section describes risks to the public, co-located worker, and facility worker due to continued storage of uranium materials at the Fernald Environmental Management Project (FEMP) site, or receipt and storage of these materials at other Oak Ridge Operations (ORO) sites described in Sect. 2. Risks are evaluated for routine operations and non-routine (accident) conditions.

C.1.1 Routine Operations

During storage of uranium materials at any of the proposed sites, workers could be exposed to direct radiation from surface contamination on storage containers. However, all containers will have been checked, overpacked if deemed necessary, and certified for transport before storage. Therefore, worker exposure due to routine operations associated with surveillance and maintenance of stored materials is expected to be less than detectable levels.

In addition to surface contamination, radiation dose from the stored uranium materials can be expected. Dose rates from any single stored container are no more than 3 to 4 mrem/h. The dose rate at a distance of 1 ft from a container is ~1 mrem/h, and the rate at a distance of 20 ft is <0.5 mrem/h (approximately the same as normal background radiation doses). These dose rates are not affected by stacking the containers because the containers and the materials themselves provide significant shielding. These dose rates are considered negligible to any receptor (facility worker, co-located worker, or public).

C.1.2 Accidents

Accidents that could occur under the proposed action(s) are analyzed in this section. Potential accidents could be initiated during facility operations or could be caused by natural phenomena (earthquake and wind). Reasonably foreseeable accidents have been screened to identify the accident with the greatest consequences to co-located workers and the public. These are the "bounding" accidents that provide an envelope for the consequences of other potential accidents with less impact.

The analysis is based on accidents that could occur during storage in the facilities described in Sect. 2 as the proposed action and alternatives. The inventories for each option are the same and are shown in Table B.1.

Each facility is assumed to consist of one or more storage areas. Fire suppression systems may be available for storage in existing buildings. On-site fire department response, however, is assumed for all options.

C.1.2.1 Postulated Accident Scenarios

Postulated accidents have been identified by a review of current safety documentation, such as Bases for Interim Operations for current storage locations at the FEMP site.

Table C.1. Inventory and Storage Requirements

					Number	Average
	Inventory		Assumed	Assumed	of	Inventory per
	(lb)	MTU	Physical Form	Packaging*	Packages	Package
Normal uranium						
Primary ingots	1.13E+05	4.99E+01	Solid metal	Wooden boxes	6.10E+01	8.18E-01
Product ingots	4.10E+04	1.90E+01	Solid metal	Wooden boxes	2.20E+01	8.64E-01
Derbies	8.38E+03	3.71E+00	Solid metal	Wooden boxes	1.20E+01	3.09E-01
Cores	3.06E+04	1.40E+01	Solid metal	Drums	5.10E+01	2.75E-01
Clad metal	6.02E+04	2.66E+01	Solid metal	Drums	7.70E+01	3.46E-01
Recycle metal	1.69E+05	7.48E+01	Solid metal	Drums	2.22E+02	3.37E-01
Total normal	4.22E+05	1.88E+02			4.45E+02	
Depleted uranium						
Primary ingots	7.36E+05	3.34E+02	Solid metal	Metal boxes	1.38E+02	2.42E+00
Product ingots	7.70E+05	3.49E+02	Solid metal	Metal boxes	1.07E+02	3.26E+00
Cores	1.33E+06	6.04E+02	Solid metal	Metal boxes	2.22E+02	2.72E+00
Recycle metal	1.09E+05	5.00E+01	Solid metal	Metal boxes	1.80E+01	2.78E+00
UF ₄	4.14E+06	1.42E+03	Composite	Metal boxes	5.47E+02	2.60E+00
			solid			
Total depleted	7.09E+06	2.76E+03			1.03E+03	
Low-enriched uranium						
>1% ²³⁵ U UO ₃ oxide	4.33E+05	1.62E+02	Composite solid	Wooden boxes	2.21E+03	7.34E-02
0.72-1.0% U ₃ O ₈ oxide	7.09E+05	2.22E+02	Composite solid	Drums	8.06E+02	2.75E-01
>1% ²³⁵ U U ₃ O ₈ oxide	2.40E+05	7.30E+01	Composite solid	Wooden boxes	1.22E+03	5.96E-02
0.72-1.0% ²³⁵ U UF ₄	1.63E+04	5.00E+00	Composite solid	Drums	1.90E+01	2.63E-01
1-2% ²³⁵ U UF ₄	1.13E+05	3.80E+01	Composite solid	Drums	1.74E+03	2.18E-02
1.25% ²³⁵ U primary ingots	4.28E+04	2.00E+01	Solid metal	Wooden boxes	2.50E+01	8.00E-01
1.25% ²³⁵ U product ingots	5.09E+03	2.00E+00	Solid metal	Wooden boxes	3.00E+00	6.67E-01
<1% ²³⁵ U clad metal	6.17E+04	2.80E+01	Solid metal	Wooden boxes	4.90E+01	5.71E-01
>1% ²³⁵ U clad metal	7.30E+03	4.00E+00	Solid metal	Wooden boxes	6.00E+00	6.67E-01
1.25% ²³⁵ U derby metal	2.08E+05	9.40E+01	Solid metal	Wooden boxes	3.55E+02	2.65E-01
1.25% ²³⁵ U recycle metal	1.49E+05	6.70E+01	Solid metal	Wooden boxes	1.19E+02	5.63E-01
0.95% ²³⁵ U recycle metal	1.81E+05	8.20E+01	Solid metal	Wooden boxes	1.44E+02	5.69E-01
1.0-19.9% ²³⁵ U UO ₂	6.41E+03	2.00E+00	Composite solid	Wooden boxes	1.76E+02	1.14E-02
Additional aisle spacing						
Total low enriched	2.17E+06	7.99E+02			6.88E+03	
Total	9.68E+06	3.75E+03			8.36E+03	

[&]quot;All wooden boxes placed in metal, sea-land container upon receipt prior to storage.

MTU = metric tons of uranium.

Types of accidents that could occur during implementation of the proposed action(s) can be grouped into two classes. As shown in Table B.2, these classes are fire and mechanical upset. External events such as natural phenomena are potential initiating mechanisms for both classes of accidents. The accidents shown in Table B.2 are determined to be "credible," a term that is used in safety analysis to mean that the accident has an annual probability of 1E-6 or greater. U.S. Department of Energy (DOE) Standard 3009-94, Preparation Guide for U.S. Department of Energy Nonreactor Nuclear Facility Safety Analysis Reports (DOE 1994a), defines frequency classes as shown in Table B.3.

Table C.2. Postulated Accidents Identified for Uranium Storage Facility

	Oper	ational Events	External Events
Operation	Fire	Container Breach	Natural Phenomena
Handling	Forklift fire affecting small number of containers	Forklift impact with storage containers	Not applicable; containers handled for short period of time
		Container(s) dropped during handling	
Storage (includes surveillance and maintenance)	Large fire affecting storage containers in single storage area	Forklift impact with storage containers	Release, small fires in all storage areas
	Small fire affecting limited number of storage containers	Corrosion, degradation of storage containers	

Table C.3. Frequency Classes Considered in Accident Analysis

Frequency Class	Frequency, events/year	Definition
Likely	>1E-2	May be expected to occur once or more during the lifetime of the facility
Unlikely	1E-4 to 1E-2	Not expected but may occur during the lifetime of the facility
Extremely unlikely	1E-6 to 1E-4	Will probably not occur during the lifetime of the facility
Not credible	<1E-6	Has extremely low probability of occurring

The accidents shown in Table B.2 were selected to represent the range of postulated accidents that could occur under the proposed action and alternatives. Accidents are shown for general handling and storage operations. Bounding accidents are discussed below.

Fires

Fires resulting in release of uranium are postulated for both handling and storage operations. The types of fires include gasoline/diesel fuel fires caused by forklift accidents and fires involving storage containers. An unmitigated fire could spread to all storage containers in a single storage area; therefore, the entire contents of all containers in that area become the material at risk (MAR). However, this is an extremely unlikely event due to minimal ignition sources and combustible loading. Small fires, involving limited numbers of containers, are more likely but result in substantially smaller releases to the atmosphere.

Container Breach

Container breach includes events such as releases from leaking containers (primarily due to long-term corrosion), forklift puncture during movement of other containers, and dropping containers during placement into long-term storage. The container breach would result in small releases to the atmosphere.

Single-container handling accidents are considered "bounding" because these events dominate the radiological risk to workers due to the relatively high frequency of such events and the proximity of the workers to any release. Such events include handling and movement of storage containers from the loading dock to the final storage location. These operations are prone to mechanical stresses in industrial accidents, such as drops and releases from a container or punctures by a forklift; however, airborne releases resulting from breaches in a single container are relatively insignificant compared with releases involving fires. As a result, these handling accidents usually constitute little hazard to the general public.

Natural Phenomena

Natural phenomena events such as high wind and earthquake have the potential to cause damage to buildings and structures leading to consequences that equal or exceed the consequences of operational accidents. For natural phenomena events, evaluation criteria for design basis events are based on the Performance Category 3 natural phenomena intensities specified for each site for Hazard Category 2 nuclear facilities and are shown in Table B.4 (doe 1994b).

Site	Event	Intensity	Frequency/year
Fernald	Earthquake	0.16 g	5E-4
	Straight wind	70 mph	2E-2
	Tornado	139 mph	1E-3
Portsmouth	Earthquake	0.19 g	5E-4
	Straight wind	70 mph	2E-2
	Tornado	110 mph	1E-3
Paducah	Earthquake	0.35 g	5E-4
	Straight wind	70 mph	2E-2
	Tornado	144 mph	1E-3
Oak Ridge	Earthquake	0.19 g	5E-4
	Straight wind	70 mph	2E-2
	Tornado	113 mph	1E-3

Table C.4. Natural Phenomena Intensities

During the seismic event defined above, all facility structures are assumed to be destroyed, and nothing but rubble remains. All utilities are lost. All releases are at ground level. Radiological materials that can be suspended in air in respirable form and be available for transport are considered to be released from direct seismic accelerations.

Following the seismic event, a number of small fires may occur due to electrical shorts or downed power lines. Any fires would be scattered throughout the rubble and would be exposed to the outside elements since no building structure remains. The top layer of rubble would consist primarily of noncombustible materials such as reinforced concrete and structural steel from buildings, or structural supports from TSSs. The fire is assumed to be slow-burning amid the rubble and fallen/breached storage containers. All fire mitigation facilities are assumed destroyed, and all roadways are blocked by debris. Therefore, there is no fire mitigation by either the on-site fire department or other outside agencies.

Seismic events are used as the surrogate initiator for straight winds or tornadoes for the overriding reason that standard atmospheric dispersion modeling predicts greater dispersion (and hence greatly reduced airborne concentration) for high wind conditions than for the stable wind conditions assumed to be present during earthquakes. Existing analyses in DOE safety analysis reports suggest that seismic events generally bound the risks of winds or tornadoes, including the risks from wind-driven projectiles. With respect to such projectiles, unpublished preliminary analyses for waste drums stored on outdoor pads show that damage from projectiles could exceed damage caused by seismic events primarily because of the stability of the drum-stacking arrangement and the lack of protection against projectiles. The same phenomenon is assumed to apply to the containers proposed for uranium storage. To appropriately bound potential damage by projectiles to unprotected storage areas, the damage assumed for seismic events is conservatively defined to have higher damage ratios than those that might otherwise be used to bound the damage caused by high winds or wind-driven projectiles.

Although not explicitly determined, it is assumed that the uranium storage facility is a Hazard Category 2 facility based on the criteria of DOE-STD-1027-92 (DOE 1992). The frequencies shown in Table B.4 represent the frequencies of facility failure under challenge from natural phenomena.

C.1.2.2 Development of Source Terms for Accident Sequences

The approach taken in this assessment is to convert MAR quantities to atmospheric source terms using conservative release factors. These source term factors, based on DOE-HDBK-3010-94 (DOE 1994c), take into account the physical mechanism through which material becomes airborne as well as the fraction of airborne materials in the respirable particle size range (<10 microns). The source term associated with each accident is the product of four factors that vary for type of material and container affected by the accident:

Source term = $MAR \times DR \times ARF \times RF$

where:

MAR = material at risk, DR = damage ratio,

ARF = airborne release fraction,

RF = respirable fraction.

C.1.2.3 Evaluation of Source Term Parameters and Frequencies

This section discusses the development of frequency and source term data for general handling accidents and storage accidents.

General Handling Accidents

The dominant contributor to worker risk from radioactive material releases is expected to result from mechanical breaches of storage containers during handling accidents. This expectation stems from the relatively high frequency of such occurrences and the proximity of the worker to the point of release in such events. Handling accidents include container breaches caused by drops or forklifts or other vehicular impact.

100

Although one container would generally be breached in an accident, rupture of multiple containers could occur in instances when several containers are being handled at a time.

Source Term Parameters. The MAR for handling operations with stacked arrays generally varies from one to four drums, depending on the method of stacking and the arrangement of the array. The maximum MAR for a pallet of four drums containing normal uranium-clad metal is 0.35 metric tons of uranium (MTU) per drum. The maximum MAR for a single box is 2.6 MTU UF₄ in the form of composite or aggregate solids or 3.3 MTU product ingots (both depleted uranium). The damage ratio (DR) for the MAR depends on several factors, including physical form of the MAR and the severity of the accident stress. In general, breached containers with solid metal uranium forms (ingots, derbies, cores, recycle metals) are assumed to have DRs of no greater than 0.10 (i.e., no more than 10% of the material is directly impacted or damaged by the event). For other containers with UF₄ and U₃O₈ (assumed to be in the form of a composite or aggregate solid), the single-container DR is assumed to be 0.25. The combined airborne release fraction/respirable fraction (ARF/RF) for composite solids subjected to free-fall spill and impaction stress is ~1E-5. The combined ARF/RF for metals is essentially negligible but is estimated to be 1E-6 as a conservative assumption.

Frequency. On the basis of numerous studies evaluated for other environmental impact statements, a probability of one handling error per 10,000 containers handled is used in this analysis. It is assumed that two severe breaches of confinement occur for each inventory of 10,000 containers handled. All containers will be moved into place within a relatively short period of time (assumed to be no more than 6 months) and will not be handled again after they are placed in storage. Based on the estimated total number of containers handled at the storage facility (see Table B.1), the frequency of handling breaches is 3.3/year (anticipated).

Storage Area Fires

For the purposes of this assessment, the single largest storage area, based on estimated storage area, is assumed to bound the risk to workers and the public. This event is a fire that involves the entire inventory of depleted uranium stored primarily in metal boxes.

Source Term Parameters. The MAR is the entire inventory of depleted uranium (see Table B.1). The DR for materials in metal containers exposed to fires is 0.1. The ARF and RF for airborne release of particulates during complete oxidation of uranium metal mass are 1E-3 and 1.0, respectively. For composite solids, the ARF and RF are 6E-3 and 1E-2, respectively.

Frequency. Although fire data from DOE sites indicate that facility fires are credible, fires of this magnitude in storage facilities with low combustible loading and limited ignition sources are considered extremely unlikely.

Storage Area Seismic Event

The dominant contributor to risk from uranium releases is expected to result from breaches of storage containers in an earthquake followed by a number of small fires. The event would impact all storage containers in the facility.

Source Term Parameters. The MAR is shown in Table B.1. DRs for stacked storage containers are estimated to be 0.075 for metal boxes and drums (all wooden boxes placed in metal sea-land containers before storage). The combined ARF/RFs for metals and composite solids are the same as those for general handling accidents. Release factors for subsequent fires are the same as those described for storage area fires; however, the MAR is 10% of the actual inventory because the fires are small, distributed throughout the storage areas, and impact only the outside layers of the rubble and fallen/breached storage containers.

Frequency. The annual frequencies of seismic events exceeding the design basis for Hazard Category 2 facilities were shown in Table B.4. Conditional probabilities are estimated to be 0.05 for inducing a number of unmitigated fires. The overall frequency for each site is 2.5E-5/year (unlikely).

C.1.2.4 Results

Radiological source terms and consequences for the bounding accident scenarios are presented in this section.

Source Terms for Bounding Accident Scenarios

Airborne source terms are estimated based on MARs and release parameters identified in Sect. B.1.2.3 and are expressed in units of grams. The activity (Ci/g) for each type of material released is based on enrichment estimates shown in Table B.1. Normal and depleted uranium is considered to be no more than 0.71% ²³⁵U with specific activity of 3.5E-7 Ci/g. Low-enriched uranium (LEU) can have enrichments up to 20% ²³⁵U with specific activities as high as 7.0E-7 Ci/g. These activities are used to estimate airborne source terms in units of curies. These source term estimates are shown in Table B.5.

Consequences for Bounding Accident Scenarios

Consequences to facility workers, co-located workers (assumed to be located 100 m from the release point), and the public are estimated for each bounding accident scenario at each proposed facility location. For the facility worker and co-located worker, the consequences are the same regardless of site. For the public, consequences vary depending on distances to the site boundaries. Distances and associated dispersion parameters for each site are shown in Table B.6 for ground-level releases (general handling events and direct seismic event). For elevated releases (15 m) due to hot air buoyancy effects from fires, the maximum dispersion parameter occurs at a distance of 270 m from the release point. This value (3.51E-4 s/m³) is used for releases due to fires for all sites regardless of distance to the site boundary and is, therefore, conservative (i.e., dispersion parameters due to elevated releases for receptors located at other distances are lower). Dispersion parameters are based on a point-source Gaussian dispersion model described in *Handbook on Atmospheric Diffiusion* (DOE/TIC-11223, Hanna et al. 1982) and are evaluated for F-Class wind stability with windspeed of 1.5 m/s. All receptors are considered to be at ground level.

Consequences are shown in Table B.7 for all receptors for the facility at each site with the largest dispersion parameter (i.e., closest distance to site boundary). The exception is the ETTP site where one facility (K-1066F) is less than 100 m from the site boundary and is evaluated separately. Other parameters included in estimating consequences include:

- Breathing rate of 3.3E-4 m³/s based on recommendations from the International Commission on Radiological Protection.
- Inhalation 50-year committed effective dose equivalent dose conversion faction (DCF) for uranium of 1.2E+8 rem/Ci (Internal Dose Conversion Factors for Calculation of Dose to the Public, DOE/EH-0071, DOE 1988).

Table C.5. Source Terms for Bounding Accident Scenarios

	Type of Uranium	MAR, MTU	Assumed Physical Form	Assumed Packaging	DR	ARF	RF	Airborne Source Term (g)	Activity (Ci/g)	Airborne Source Term (Ci)
General Hand Clad metal Product ingots UF ₄	General Handling Accidents Clad metal Normal Product ingots Depleted UF4	1.38E+00 3.26E+00 2.60E+00	Solid metal Solid metal Composite solid	Drums Metal boxes Metal boxes	1.00E-01 1.00E-01 2.50E-01	1.00E-06 1.00E-06 1.00E-05	1.00E+00 1.00E+00 1.00E+00	1.26E-01 2.96E-01 5.90E+00	3.50E-07 3.50E-07 3.50E-07	4.39E-08 1.03E-07 1.24E-04
Storage Area Fire Solid metal UF ₄ Total	Fire Depleted Depleted	1.34E+03 1,42E+03	Solid metal Composite solid	Metal boxes Metal boxes	1.00E-01 1.00E-01	1.00E-03 6.00E-03	1.00E+00 1.00E-02	1.21E+05 7.73E+03	3.50E-07 3.50E-07	4.24E-02 2.70E-03 4.51E-02
Storage Area Solid metal Solid metal Solid metal Solid metal UF ₄ UF ₄ U ₃ O ₈ , UF ₄ U ₃ O ₈ , UF ₄ Solid metal Total	Storage Area Seismic Event Solid metal Normal Solid metal Normal Solid metal Depleted UF ₄ Depleted U ₃ O ₈ , UF ₄ Low-enriched U ₃ O ₈ , UF ₄ Low-enriched Solid metal Low-enriched	7.26E+01 1.15E+02 1.34E+03 1.42E+03 2.37E+02 2.65E+02	Solid metal Solid metal Solid metal Composite solid Composite solid Composite solid Solid metal	Metal boxes Drums Metal boxes Metal boxes Metal boxes Metal boxes Metal boxes Metal boxes	7.50E-02 7.50E-02 7.50E-02 7.50E-02 7.50E-02 7.50E-02	1.00E-06 1.00E-06 1.00E-06 1.00E-05 1.00E-05 1.00E-06	1.00E+00 1.00E+00 1.00E+00 1.00E+00 1.00E+00 1.00E+00	4.94E+00 7.85E+00 9.09E+01 9.66E+02 1.61E+02 1.80E+02 2.02E+01	3.50E-07 3.50E-07 3.50E-07 3.50E-07 7.02E-07 3.74E-07 3.60E-07	0 2.75E-06 3.18E-05 3.38E-04 0.0000113 0.00007 0
Storage Area Seisn Solid metal Solid metal Solid metal I U ₄ I U ₃ O ₈ , UF ₄ Lov U ₃ O ₈ , UF ₄ Lov Solid metal Lov	Storage Area Seismic Event Fire Solid metal Normal 1 Solid metal Normal 1 Solid metal Depleted 1 U ₄ Depleted 1 U ₅ O ₈ , UF ₄ Low-enriched 2 U ₅ O ₈ , UF ₄ Low-enriched 2 Solid metal Low-enriched 2 Total	ire 7.26E+01 1.15E+02 1.34E+03 1.42E+03 2.37E+02 2.65E+02 2.97E+02	Solid metal Solid metal Solid metal Composite solid Composite solid Composite solid Solid metal	Metal boxes Drums Metal boxes Metal boxes Metal boxes Metal boxes Metal boxes Metal boxes	7.50E-02 7.50E-02 7.50E-02 7.50E-02 7.50E-02 7.50E-02	1.00E-03 1.00E-03 1.00E-03 6.00E-03 6.00E-03 1.00E-03	1.00E+00 1.00E+00 1.00E+00 1.00E-02 1.00E-02 1.00E-02	6.59E+04 7.85E+03 9.09E+04 5.80E+03 1.29E+04 1.08E+03	3.50E-07 3.50E-07 3.50E-07 3.50E-07 7.02E-07 3.74E-07 3.60E-07	0.000173 0.000275 3.18E-03 2.03E-04 6.79E-05 0.00004 0.000727

MAR = material at risk. MTU = metric tons of uranium.

C-10

Table C.6. Distances and Dispersion Parameters for Ground-Level Releases for Bounding Accident Scenarios

Site	Building	Distance to Site Boundary (m)	Dispersion Parameter X/Q (s/m³)
* 11 - 17			
All sites		1.00E+02	3.43E-02
Fernald	Plant 1 Pad	3.35E+02	3.21E-03
Portsmouth	X-3001	8.76E+02	5.43E-04
	X-3002	1.07E+03	3.84E-04
	X-7725A	7.82E+02	6.68E-04
	X-7745R	1.06E+03	3.84E-04
	Lithium Storage	7.86E+02	6.68E-04
	X-744K	8.70E+02	5.43E-04
	X-744G	7.15E+02	8.47E-04
Paducah	C-752/greenfield	5.11E+02	1.56E-03
Y-12 Plant	9204-4	5.37E+02	1.56E-03
	9720-33	5.37E+02	1.56E-03
ETTP	K-1066F	7.60E+01	5.33E-02
	K-131, 631	8.38E+02	6.68E-04
	K-861 Open Area	6.10E+02	1.12E-03

ETTP = East Tennessee Technology Park.

		Airborne	;		Worker	Co-locate	Co-located Worker"	Public	lic	Maximim
Accident	Site	Source Term (Ci)	Breathing Rate (m³/s)	DCF (rem/Ci)	Dose (rem)	X/Q (s/m³)	Dose (rem)	λ/Q (s/m³)	Dose (rem)	Consequence
General handling Storage area fire Storage area seismic	Fernald Portsmouth Paducah Y-12 Plant ETTP (K-1066F) ETTP (other) All Fernald Portsmouth Paducah Y-12 Plant ETTP (K-1066F)	2.06E-06 2.06E-06 2.06E-06 2.06E-06 2.06E-06 2.06E-06 4.51E-02 5.62E-04 5.62E-04 5.62E-04 5.62E-04 5.62E-04	3.33E-04 3.33E-04 3.33E-04 3.33E-04 3.33E-04 3.33E-04 3.33E-04 3.33E-04 3.33E-04 3.33E-04 3.33E-04	1.20E+08 1.20E+08 1.20E+08 1.20E+08 1.20E+08 1.20E+08 1.20E+08 1.20E+08 1.20E+08 1.20E+08 1.20E+08 1.20E+08	3.14E-03 3.14E-03 3.14E-03 3.14E-03 3.14E-03 n/a	3.43E-02 3.43E-02 3.43E-02 5.33E-02 3.43E-02 3.51E-04 3.43E-02 3.43E-02 3.43E-02 5.33E-02 3.43E-02 3.43E-02 5.33E-02	2.82E-03 2.82E-03 2.82E-03 4.39E-03 4.39E-03 6.33E-01 7.70E-01 7.70E-01 7.70E-01 7.70E-01 7.70E-01 6.55E-02	3.21E-03 8.47E-04 1.56E-03 1.56E-03 5.33E-02 1.12E-03 0.0004 3.21E-03 1.56E-03 5.33E-02 1.12E-03 3.51E-04	2.64E-04 6.97E-05 1.28E-04 1.28E-04 4.39E-03 9.22E-05 6.33E-01 7.21E-02 1.90E-02 3.50E-02 3.50E-02 2.52E-02 6.55E-02	Negligible Negligible Negligible Negligible Negligible Low
Total seismic	Fernald						8.36E-01		0.138	Low
	Paducah Paducah						8.36E-01		8.45E-02	Negligible
	Y-12 Plant						8.36E-01		1.01E-01	Low
	ETTP (K-1066F)						8.36E-01 1.26E+00		1.01E-01	Low
	ETTP (other)						8.36E-01		1.20 0.07E.01	Low
"Maximum downwing	"Maximum downwind exposure assumed for both co-located worker and public.	both co-located	worker and pub	lic.			-		7.0/E-01	ivegilgibie

Table C.7. Consequences to Facility and Co-Located Workers for Bounding Accident Scenarios

Pradminum downwing exposure assumed for both co-located worker and public.

bFacility workers assumed to evacuate during fire or seismic event before significant exposure can occur.

DCF = dose conversion factor.

ETTP = East Tennessee Technology Park.

- Worker dose estimates based on instantaneous dispersion into a hemisphere 10 m in diameter. The worker walks through the hemisphere at a rate of 1 m/s for a maximum exposure time of 10 s. Consequences to facility workers during fires or natural phenomena events are considered to be negligible because these workers are assumed to evacuate the area before significant exposure can occur. This assumption is based on standard DOE site emergency response procedures that require facility worker evacuation in the event of accidents.
- It is assumed that the co-located workers and the public are both exposed to the maximum downwind consequence. This is a conservative assumption because in most cases the location of maximum consequence occurs at a distance beyond the location of the co-located worker (i.e., 270 m versus 100 m for the co-located worker). If actual dispersion parameters for elevated releases and receptors at 100 m were used, the estimated consequences would be significantly less.
- Exposure duration is assumed to be the same as release duration for all events. This is a conservative assumption for fires because downwind receptors are not likely to remain in a smoke plume once it is detected, and fire duration is several hours. For handling events or direct release from a seismic event, it is also a conservative assumption because the materials forms are such that the radioactive materials must be dislodged before they become airborne, and the overall airborne release rate is slow relative to the rate of uptake by the receptor.

Table C.7 also indicates the maximum consequence level for each scenario at each site. These levels are based on the consequence categories shown below.

Descriptive	Radiologic	cal Consequence Levels
Word	Public	Facility and Co-located Worker
Negligible Low	≤0.1 rem ≥0.1 to <5 rem	≤1 rem
Moderate	>5 to ≤25 rem	>1 to ≤5 rem >5 to ≤100 rem
High	>25 rem	>100 rem

C.1.3 Public and Worker Risk Summary

Public and worker risks due to normal operations and accidents are shown in Table B.8. The risk categories are based on the accident frequency and maximum radiological consequence level as shown in Figure B.1. Those accident scenarios that fall within regions 7, 8, and 9 of the matrix are considered high risk and those accident scenarios that fall within regions 4, 5, and 6 are considered moderate risks. Those accident scenarios that fall within regions 1 through 3 of the matrix are considered low risk and represent less than a marginal concern.

22...

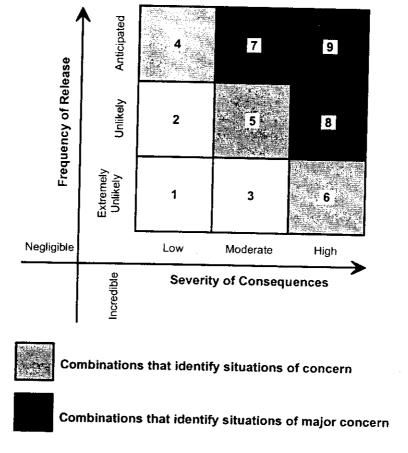


Figure C.1. Risk Ranking Matrix

Table C.8. Public and Worker Risks due to Normal Operations and Accidents

Accident Scenario	Site	Frequency	Facility Worker Dose	Co-Located Worker Dose	Public Dose	Risk
Normal operations	All	Anticipated	Negligible	Negligible	Negligible	Negligible
General handling	Fernald	Anticipated	0.003 rem	0.003 rem	<0.001 rem	~ ~
	Portsmouth	Anticipated	0.003 rem	0.003 rem	<0.001 rem	Negligible Negligible
	Paducah	Anticipated	0.003 rem	0.003 rem	<0.001 rem	Negligible
	Y-12 Plant	Anticipated	0.003 rem	0.003 rem	<0.001 rem	Negligible
	ETTP (K-1066F)	Anticipated	0.003 rem	0.004 rem	0.004 rem	Negligible
	ETTP (other)	Anticipated	0.003 rem	0.003 rem	<0.001 rem	Negligible
Storage area fire	All	Extremely unlikely	Negligible	0.63 rem	0.63 rem	Low
Seismic	Fernald	Unlikely	Negligible	0.84 rem	0.14 rem	Low
	Portsmouth	Unlikely	Negligible	0.84 rem	0.08 rem	Negligible
	Paducah	Unlikely	Negligible	0.84 rem	0.10 rem	Low
	Y-12 Plant	Unlikely	Negligible	0.84 rem	0.10 rem	Low
	ETTP (K-1066F)	Unlikely	Negligible	1.26 rem	1.26 rem	Low
TP = East Tennessee	ETTP (other)	Unlikely	Negligible	0.84 rem		Negligible

C.2 REFERENCES

DOE (U.S. Department of Energy) 1988. Internal Dose Conversion Factors for Calculation of Dose to the Public. DOE/EH-0071. July.

DOE 1992. Hazard Categorization and Accident Analysis Techniques for Compliance with DOE Order 5480.23, Nuclear Safety Analysis Reports. DOE-STD-1027-92. December.

DOE 1994a. Preparation Guide for U.S. Department of Energy Nonreactor Nuclear Facility Safety Analysis Reports. DOE Standard 3009-94. July.

DOE 1994b. Natural Phenomena Hazards Design and Evaluation Criteria for Department of Energy Facilities. DOE-STD-1020-94. April.

DOE 1994c. Airborne Release Fractions/Rates and Respirable Fractions for Nonreactor Nuclear Facilities. October.

Hanna, S. R., et al. 1982. Handbook on Atmospheric Diffusion. DOE/TIC-11223. 1982.

APPENDIX D URANIUM METAL TOXICITY AND AQUATIC BIOTA

APPENDIX D. URANIUM METAL TOXICITY AND AQUATIC BIOTA

This appendix describes the methods used to estimate the uranium metal toxicity effects to aquatic life at sites with bodies of water close to the proposed uranium material storage locations. The source of the uranium is from fires from various accident scenarios analyzed in Appendix B.

D.1 Description of how the Risks of Impacts Were Estimated for Aquatic Biota at the ETTP Site

At the ETTP, the K-131/K-631 location was evaluated for the upper-bound risks to aquatic biota from the four accidental release scenarios. This location was chosen for the upper-bound risks because of it's very close proximity to Poplar Creek, and the prevailing winds from the southwest which would mean a maximal deposition of aerial contamination in the surrounding Poplar Creek during the accident scenarios. Impacts to aquatic biota from accidents associated with the uranium being stored at either of the two alternative locations at ETTP (i.e., the open area or 1066-F) would be very similar to, but not likely greater than, those evaluated for the K-131/K-163 location.

Risks to aquatic biota were evaluated by calculating estimated deposition mass of uranium for each accident scenario (Table D.1) to calculate an estimated concentration in the volume of Poplar Creek water receiving the deposition, and comparing to acute and chronic non radionuclide toxicity benchmarks. For the General Handling and Storage Area Seismic Event accident scenarios, only composite solid uranium mass is used for the airborne source term because the solid metal is not presumed to be bioavailable to aquatic biota. However, for the Storage Area Fire scenario and Storage Area Seismic Event Fire scenario, both the composite solid and solid metal forms of uranium are used to calculate the airborne source term because fire could volatize the uranium solid metal. Estimates of the percentage of the aerial plume that would be expected to deposit in Poplar Creek were derived by calculating the area of Poplar Creek within a 2400 ft perimeter of the boundaries of the K-131/K-631 location, and dividing that creek area by the total perimeter area that is 2400 ft from the K-131/K631 boundaries. The total deposited uranium for each accident scenario was then calculated by multiplying the total aerial source term by the estimated percentage of aerial plume expected to deposit in Poplar Creek (Table D.2). The volume of water in the affected portion of Polar Creek was estimated by assuming an average stream width of 225 ft, along with a estimated average depth of 4 ft, and stream length of 14770 ft (1.329E+07 cu.ft = 3.7462E+08 L). Estimated uranium concentrations in Poplar Creek for each accident scenario were derived using the estimated mass of aerial deposition (in ug) into 3.7462E+08 L. Becuase uranium compoudns are relatively insoluble (Clayton & Clayton 1981) the dissolved uranium fraction was estimated to be 0.001 of the net aerial deposition amount

Potential adverse affects to populations of aquatic biota were evaluated by dividing estimated concentrations of uranium in Poplar Creek by non radiological toxicity benchmarks for uranium. The toxicity benchmarks used for this analysis were EPA Tier II values. The EPA Tier II secondary acute and chronic toxicity benchmark values for uranium are 46 ug/L and 2.6 ug/L, respectively (Suter and Tsao 1996). The Tier II values are developed for chemicals without national ambient water quality criteria (NAWQC), and are concentrations that are expected to exceed NAWQC only 20% of the time. The acute NAWQC are intended to correspond to concentrations that would cause less than 50% mortality in 5% of exposed aquatic biota populations during a brief exposure. The estimated uranium concentrations in the pond were divided by the acute and chronic toxicity benchmarks to obtain acute and chronic HQs. HQs greater than 1 indicate potential adverse affects to populations of aquatic biota.

Table D.1. Source terms for bounding accident scenarios for aquatic biota at ETTP locations

	Types of uranium	Airborne source term (μg)
General Hand	lling Accidents	
UF4	Depleted	5.90E+06
Total	-	5.90E+06
Storage Area	Fire	
Solid metal	Solid metal	1.21E+11
UF4	Composite solid	7.73E+09
Total		1.29E+11
Storage Area	Seismic Event	
UF4	Depleted	9.66E+08
U3O8, UF4	Low-enriched	1.61E+08
U3O8, UF4	Low-enriched	1.80E+08
Total		1.30E+09
Storage Area S	Seismic Event Fire	
Solid metal	Normal	6.59E+10
Solid metal	Normai	7.85E+09
Solid metal	Depleted	9.09E+10
UF4	Depleted	5.80E+09
U308, UF4	Low-enriched	1.29E+10
U308, UF4	Low-enriched	1.08E+09
Solid metal	Low-enriched	2.02E+04
Total		2.05E+11

Table D.2. Summary of uranium deposition, concentrations in Poplar Creek, and acute and chronic Hazard Quotients for biota at ETTP

Total airborne source term (µg)	Plume deposition factor	Net aerial deposition (µg)	Total Dissolved Uranium* (µg)	Estimated maximum uranium concentration in Poplar Creek* (µg/L)	Acute HQ	Chronic HQ
Canaval Handling						
General Handling						
5.90E+06	1.25E-01	7.38E+05	7.38E+02	2.57E-05	5.59E-07	9.89E-06
Storage Area Fire	:					
1.287E+11	1.25E-01	1.61E+10	1.61E+07	5.61E-01	1.22E-02	2.16E-01
Storage Area Seis	mic Event					
1.31E+09	1.25E-01	1.63E+08	1.63E+05	5.70E-03	1.24E-04	2.19E-03
Storage Area Seisi	mic Event Fire					
2.05E+11	1.25E-01	2.56E+10	2.56E+07	8.92E-01	1.94E-02	3.43E-01

Plume deposition factor = (area of Poplar Creek within 2400 ft perimeter around K-131/K-163 boundaries)/(total area of the 2400 ft perimeter around the K-131/K-163 boundaries).

Net aerial deposition = (total airborne source term) * (plume deposition factor).

^aDissolved uranium = net aerial deposition/1000 (to account for insolubility of U-308 and UF₄.

^bDissolved uranium/volume of Poplar Creek in affected area (where volume is 2.867E+08 L).

Acute HQ = Estimated maximum concentration of uranium in Poplar Creek/Tier II secondary acute value of 46 mg/L.

Chronic HQ = Estimated maximum concentration of uranium in Poplar Creek/Tier II secondary chronic value of 2.6 mg/L.

D.2 Impacts to Aquatic Biota from Accident Scenarios at ETTP

For all accident scenarios (Table D.2), uranium metal toxicity to aquatic biota for both acute and chronic exposure is negligible with all Hazard Quotients (HQs) less than 1. Also, the uranium would tend to be flushed out of Poplar Creek via stream flow and be bound up in the sediments.

D.3 Description of How the Risks of Impacts Were Estimated for Aquatic Biota at the Portsmouth Gaseous Diffusion Plant

Risks to aquatic biota were evaluated by calculating estimated deposition mass of uranium for each accident scenario (Table D.3) to calculate an estimated concentration in the volume of Holding Pond water receiving the deposition, and comparing to acute and chronic non radionuclide toxicity benchmarks. For the General Handling and Storage Area Seismic Event accident scenarios, only composite solid uranium mass is used for the airborne source term because the solid metal is not presumed to be bioavailable to aquatic biota. However, for the Storage Area Fire scenario and Storage Area Seismic Event Fire scenario, both the composite solid and solid metal forms of uranium are used to calculate the airborne source term because fire could volatize the uranium solid metal. Estimates of the percentage of the aerial plume that would be expected to deposit in the X-2230M Holding Pond were derived by calculating the area of the pond, and dividing it by the total perimeter area that is 2400 ft from the X-3340 boundaries. The total deposited uranium for each accident scenario was then calculated by multiplying the total aerial source term by the estimated percentage of aerial plume expected to deposit in pond (Table D.3). The volume of water in the X-2230M Holding Pond was estimated by assuming a length of 675 ft on two sides, and a width of 112.5 ft on the west end, for a total area of 37800 sq. ft. The pond is assumed to have an average depth of 4 ft. Thus the total estimated volume is 1.512E+05 cu. ft., which equals 4.28E+06 L. Estimated uranium concentrations in the X-2230M Holding Pond for each accident scenario were derived using the estimated mass of aerial deposition (in µg) into 4.28E+06 L. Uranium solubilities were estimated in similar fashion as described for ETTP.

The EPA Tier II secondary acute and chronic toxicity benchmark values for uranium, $46 \mu g/L$ and $2.6 \mu g/L$, respectively (Suter and Tsao 1996) were also used to evaluate the risks to aquatic biota. The estimated uranium concentrations in the pond were divided by the acute and chronic toxicity benchmarks to obtain acute and chronic HQs. HQs greater than 1 indicate potential adverse affects to populations of aquatic biota.

D.4 Impacts to Aquatic Biota from Accident Scenarios at the Portsmouth Gaseous Diffusion Plant

For all accident scenarios (Table D.3), uranium metal toxicity to aquatic biota for both acute and chronic exposure is negligible with all HQs less than 1.

D.5 References

Clayton, G. D. and F.E. Clayton. 1981. Patty's Industrial Hygiene and Toxicology. Vol. 2A: Toxicology, 3rd edition. John Wiley & Sons, New York.

Table D.3. Summary of uranium deposition, concentration on Holding Pond, and acute and chronic hazard quotients

Location	Total airborne source (µg)	Total aerial deposition area (sq. ft.)	Area of the Pond (sq. ft.)	Plume deposition factor	Net aerial deposition in pond (ug)	Dissolved Uranium	Estimated volume of pond	Estimated uranium conc in pond		
X-3340					à	/CB/		(1/8/L)	Acute HQ	Acute HQ Chronic HQ
General H	General Handling Accidents 5.90E+06 7.80	ndling Accidents 5.90E+06 7.80E+06	3.78E+04	4.84E-03	2.86E+04	2.86E+01 4.28E+06	4.28E+06	6.68E-03	1.45E-07	2.57E-06
Storage ,	Storage Area Fire	,								
	1.29E+11	1.29E+11 7.80E+06	3.78E+04	4.84E-03	6.24E+08	6.24E+05 4.28E+06	4.28E+06	1.46E-01	3.17E-03	5.60E-02
Storage Ar	Storage Area Seismic Event 1.31E+09 7.80	a Seismic Event 1.31E+09 7.80E+06	3.78E+04	4.84E-03	6.35E+06	6.35E+03	4.28E+06	1.48E-03	3.22E-05	5.70E-04
Storage Area Seismic Event Fire 2.05E+11 7.80E+06 3,78E+04 4.84E-03 9,9	Storage Area Seismic Event Fire 2.05E+11 7.80E+00	a Seismic Event Fire 2.05E+11 7.80E+06	3.78E+04	4.84E-03	9.93E+08	9 03E±0€	0038+06 4398-06 53555			

Total aerial deposition area is area within 2400 ft perimeter of the X-3340 boundaries.

Plume deposition factor is the ratio of area of the X-2230M Holding Pond and total aerial deposition area.

Net aerial deposition in pond is total airborne source*plume deposition factor.

Acute HQ = estimated maximum concentration of uranium in the pond/Tier II secondary acute value of 46 µg/L.

Chronic HQ = estimated maximum concentration of uranium in the pond/Tier II secondary chronic value of 2.6 µg/L.

...

APPENDIX E COMMENTS AND RESPONSES

APPENDIX E. COMMENTS AND RESPONSES

Response to Comments on the Environmental Assessment for the U. S. Department of Energy, Oak Ridge Operations Receipt and Storage of Uranium Materials from the

Fernald Environmental Management Project Site (DOE/ORO-2078)

Walter Frazier 2230 Russell Avenue West Portsmouth, Ohio 45663-6247

1. Mr. Frazier indicates that he has 53 acres of land in Texas which he offers would be willing to discuss with DOE as a possible storage site.

Response: The uranium materials discussed in this EA are not suitable for storage without proper surveillance. The cost of establishing a new site is likely prohibitively expensive and could not be done in the time required. As noted in section 2.8.1 no commercial facilities were considered.

Mr. Alfred B. Puckett 6365 Bethel Ct. Rd. Kevil, Ky. 42053

1

1. I am opposed to the DOE plan to make west Kentucky a nuclear waste dump. The Paducah plant site is on a major earthquake fault and our experts say the big one could happen anytime and be a major disaster. We don't need any more nuclear waste; in fact, the nuclear waste we now have should be sent someplace else.

Response: The uranium material discussed in this EA is not a waste; it is a product. Comment noted.

Robert Peele 130 Oklahoma Avenue Oak Ridge, TN. 37830

1. I found no information on the toxic effects of uranium other than the radioactivity. Response: Information on the toxic effects of uranium metal, especially to aquatic organisms, has been added to the EA.

2. The reader is told of the distance from Poplar Creek of prospective storage locations at ETTP, but the elevation above creek level and flooding history were not mentioned.

Response: Information in section 3.5.3 indicates that most of the ETTP site is above the probable maximum flood. Text has been added to specifically state that all proposed storage locations at ETTP are above the 100-year flood level. According to the USGS topographic map for ETTP (DOE 1999), storage location K-131/K-631 elevation is approximately 780 ft, which is about 40 feet above the Poplar Creek level of 735-740 ft. The open area location elevation is about 760 ft, some 20 feet above the Poplar Creek level. Storage location K-1066 F elevation is also approximately 780 feet.

Water levels in Poplar Creek, which is a tributary of the Clinch River, are controlled to a large extent by Melton Hill Dam approximately 18 km (11 miles) upstream from the confluence of Poplar Creek and the Clinch River. All three locations are outside the 100-year flood plain boundary of Poplar Creek.

3. No information is given on the average isotopic composition of the depleted uranium present. If the U has nearly natural composition, then the material could compete as feed material for gaseous diffusion. If it has the 0.3 or 0.4% U-235 content usual for depleted uranium, the likelihood of sale in the near future may be small.

Response: For the purposes of the risk assessment, as stated on page B-9 of the Draft EA, for normal and depleted uranium is considered to be no more than 0.71% U235. This value is considered conservative. The uranium materials discussed in this EA or slated to be marketed or used.

- 4. I could not readily determine the basis of the risk calculations. Statements about air concentrations near the ORR seem questionable. Pg. 3-1 suggests the normal background dose rate is 0.5mrem/hr. Unusual! The information provided on page 3-1 on radiation dose rates from stored uranium materials at Fernald is (and the association to background) is from a personal communication. This has been added. Information on ORR air concentrations were taken from documented sources.
- 5. The description of the hypothetical accidents was inconsistent or at least so obscure I could not follow it.

Response: DOE attempted to help the reader by providing details on methodology, assumptions, and results in Appendix B. DOE believes the results to be consistent with the methods employed.

6. How on earth did this project become such an emergency that work must be completed this fiscal year, so adequate comment time cannot be afforded.

Response: The comment period on this EA was extended to one month.

- 7. Why did DOE/ORO agree to accept the material before the EA was available. Response: DOE determined that the uranium material was a valuable product and its safe storage and eventual use was appropriate to DOE's mission.
- 8. Regardless of the above points, it appears to this reader that the facility in Portsmouth is the logical choice for storage because:
 - an appropriate building has been identified where the material can be accommodated
 - storage of such material is aligned with the site mission more correctly at considered locations other than ETTP in Oak Ridge
 - · at Portsmouth the material will stay within the same regulatory framework as at present, and
 - since the EA was issued, I read that Tennessee (TDEC) has been promised that stores of depleted uranium hexafluoride will be removed from the state within ten years. If so, there would be little sense in shipping a supply of a different fluoride to Tennessee in the near future.

Response: Comment noted.

Mark Donham Kristi Hanson RACE/Heartwood RR # 1, Box 308 Brookport, IL 62910 618-564-3367(H) 502-443-3082(W)

1. The purpose of an EA is to determine the potential significance of a proposed action. Certain factors are required by the CEQ in their NEPA regs to be considered by the agency in making this determination. These factors are found at 40 CFR 1508.27. This is, in fact, a site-specific project, and therefore, requires a site-specific context in applying these factors in the significance determination. It is our opinion that a compliant application of these factors would not result in a finding of no significant impact. Factor # 7 is the requirement that the agency look at cumulative effects during the significance determination. Some courts (for example, the 5th circuit) have ruled that during the threshold determination of significance, the duty to look at cumulative effects is even more detailed that during the EIS process, for if a FONSI is issued, this will be the only look at cumulative effects of the proposal.

Response: Cumulative impacts were examined and documented in section 4.8. DOE used the definition of cumulative effects defined in the CEQ Regulations. The effects of the proposed action when combined with past, present, and reasonably foreseeable future actions do not result in significant adverse impacts.

2. On its face, this EA is deficient. The EA inappropriately segments the actions into transportation, storage, and final disposition for purposes of NEPA analysis. This is a clear violation of NEPA. In a convoluted "Addendum", the agency tries to fast talk its way out of its duties to consider the combined effects of the storage, transportation, and long-term disposal, but this fails miserably. This is a site specific proposal, and a 1994 EA done for another part of the project, which, while it should have included the entire process, could not have because the proposal to move the material had not been made, cannot be adequate to meet the public information and scrutiny aspects of NEPA. This is not fully informing the public.

Response: As shown in the Addendum, DOE fully considered transportation of the uranium materials in several documents beginning in 1994. NEPA and CERCLA were followed and public review and comment were solicited on these actions. Further, the outbound shipments from ORO will move in DOE-approved packaging, subject to DOE radiation, contamination or fissile controls and other DOE Federal or State requirements.

3. In addition, there are cumulative effects from other ongoing projects at Paducah. These are clearly documented in the site management plan, which has not undergone NEPA review. While the management at Paducah keeps repeating as it mantra that the CERCLA analysis meets all the requirements of NEPA, the transportation addendum flatly contradicts this, stating, (finally) that "...DOE excludes Removal actions from requiring detailed NEPA documentation..." There is no doubt that there needs to be a cumulative effects analysis done of ALL the action ongoing at the site, and segmenting each individual project into a discreet analysis unit is not in compliance with NEPA. If such an analysis were undertaken, there would be no doubt that the impact would be potentially significant and require an EIS. This would and should be the site-wide EIS we have been calling for years. At a bare minimum, this should require a supplement to the EIS process ongoing for the depleted uranium, but DOE isn't even doing this. This EIS process is fatally flawed unto itself for being segmented into a discreet unit, while there are considerable and significant other actions ongoing at the site with cumulative impacts.

Response: The complete quotation from the Addendum states "Although DOE excludes CERCLA Removal Actions from requiring detailed NEPA documentation, two separate integrated CERCLA/NEPA processes (with full public involvement) were carried out at FEMP which identified

the disposition of nuclear material as a fundamental component of the remediation of OU 3." Further, see responses to comments 1 and 2 above.

4. Two other factors which are potentially significant relevant to this process are the effects on public health and safety, and the scientific uncertainly surrounding the proposal. Clearly, if there is emissions and escape of radio nuclides or uranium element into the environment which gets distributed into the food chain or into an environmental media which could cause any kind of ecological or human exposure, there is clearly a public health and safety concern which is significant. While DOE, as typical, attempts to brush these concerns off with a broad brush of statements of no impact, these conclusory statements are supported on the record with nothing. They do not comply with NEPA, which requires that findings such as this be supported with valid, objective data, which can be obtained by the public, and which is clearly identified in the record. Conclusory statements of no impact impress us not, and are in violation of NEPA. What are the emission rates of the various materials, and what are the exposure routes. What are the ecological effects, and what is the time span these effects could continue. These questions are not adequately answered or supported in the EA.

Response: As indicated in the DEA, emissions under normal operating conditions are effectively zero. The outside of the containers in which this material is packaged can be safely handled and workers require no special protection when working near the containers. Under accident situations, the doses (facility worker, co-located worker, and the public) are computed and the risk of exposure determined (see Table B.8).

5. The biggest scientific uncertainly associated with the Paducah site is the seismic hazard. It is common knowledge that the site is within a high risk seismic zone. Just recently, there has been renewed media stories about the Central Midwest Consortium's annual meeting and their call for earthquake preparedness in our region. Yet, DOE brushes this off inexplicably. This is clearly potentially significant, and needs a hard look site-wide.

Response: The radiological risk associated with seismic events at all sites was evaluated in Sections C.1.2.1 and C.1.2.3. Although the intensity for a seismic event with a frequency of 5E-4/yr is higher at the Paducah site (0.35g) than at other sites (e.g., 0.19g at Portsmouth), the same assumptions concerning damage and release were applied at all sites. These conservative assumptions include loss of all structures and utilities, fires subsequent to the initial seismic event, and ground-level releases. In reality these effects would be less at the sites with the lower seismic intensities; however, because the actual seismic design criteria for the sites are unknown, the same assumptions were applied to all sites.

6. In addition, just the fact that DOE is calling this a temporary move because they don't know what to do with the materials long term is clear evidence that there is strong scientific uncertainly associated with these materials.

Response: The uranium materials are being moved from FEMP in order to comply with a regulatory commitment made to the state of Ohio. DOE expects to use these materials as commercial product.

7. Another factor is the effects on federally listed species. While the EA lists the evening bat as federally listed, we don't believe that is correct. However, the Indiana Bat is clearly critically endangered. The conclusion that it does not occur on the plant site is not supported by the record. A clear look at the record on Indiana Bats shows that their foraging range could easily put them into the range of impact. They could easily consume insects which have become contaminated with emissions from this material. If this affects their reproductive capacity, which some evidence suggests, then this could be construed as "harm", which would be a take. It is the opinion of the commentors that an incidental take permit is necessary at this point to continue any cleanup or production activities at the plant, and failure to have completed formal Section

7 consultation to implement conservation guidelines to minimize the take is a violation of the Endangered Species Act, which would be potentially significant also under the CEQ guidelines.

Response: DOE is consulting with the U. S. Fish and Wildlife Service and state fish and game departments regarding any potential adverse impact to protected species.

8. Another potential regulatory requirement which is not mentioned in the EA is the possible requirement for a point source runoff permit for the storage area and the immediate adjacent lands. Where will this area drain, and what kind of contamination can we expect in these runoffs? Finally, wouldn't this require a RCRA permit? How would the lands being proposed for storage be regulated? What capacities would be allowed? What storage requirements would be set? How would the public be involved in this process?

Response: DOE will comply with all regulatory requirements. DOE expects no contamination from surface runoff with the possible exception of minor erosion from the construction activities.

Mr. Graham E. Mitchell Chief, Office of Federal Facilities Oversight Ohio EPA State of Ohio Environmental Protection Agency 401 East Fifth Street Dayton, OH 45402-2911

Listed below are Ohio EPA's comments on the Uranium Receipt and Storage EA:

General Comments

- 1. Ohio EPA concurs with the EA conclusion that the DOE Fernald site does need to remove 3800 metric tons of uranium from the site in order to complete cleanup activities at Fernald. Response: Comment noted.
- 2. If the ultimate location for this material is to be at the DOE of Oak Ridge facility in Tennessee, we would recommend that the material be sent there directly from Fernald to Oak Ridge. This will reduce overall shipping costs and reduce transportation risks by handling this material only once.

If any of this material is shipped to the Portsmouth Gaseous Diffusion Plant for interim or long term storage, funding should be provided to the Portsmouth site to cover the costs of managing this material. The Portsmouth cleanup budgets have been out significantly in the past several years and this storage effort should not further impact the Portsmouth cleanup program.

Response: Comment noted.

Specific Comments

3. Page 3.1.8 Infrastructure

Fernald discharges treated effluent to the Great Miami River not the Little Miami River.

Response: Text changed to reflect comment.

Ms. Susan L. Gawarecki, Ph.D., P.G. Executive Director LOC Inc Oak Ridge Reservation Local Oversight Committee 136 S. Illinois Ave., Suite 208 Oak Ridge, TN 37830

- 1. The Oak Ridge Reservation (ORR) Local Oversight Committee, Inc. (LOC) submits the following comments on the subject draft EA. The LOC Board of Directors voted unanimously to comment that the LOC would have no objection to storage of uranium materials at Y-12 that are consistent with its mission. **Response: Comment noted.**
- 2. However, the LOC objects to storage of additional uranium materials at K-25, also known as East Tennessee Technology Park (ETTP), considering that the uranium hexafluoride (UF6) cylinders currently stored there are disincentive to re-industrialization and a potential hazard to workers.

 Response: Comment noted.
- 3. The LOC is a non-profit regional organization funded by the State of Tennessee and established to provide local government and citizen input into the environmental management and operation of the DOE ORR. The board of Directors of the LOC is composed of the County Executives of Anderson, Knox, Loudon, Meigs, Morgan, Rhea, and Roane Counties; the Mayor of the City of Oak Ridge; and the Chairs of the Roane County Environmental Review Board, the City of Oak Ridge Environmental Quality Review Board, and the LOC Citizens' Advisory Panel (CAP). The CAP has up to 20 volunteer members with diverse backgrounds who represent the greater ORR region.

No preferred alternative is given in the EA. The CAP proposes that storage of the uranium materials at the Portsmouth Gaseous Diffusion Plant be the preferred alternative, for the following reasons:

The Portsmouth facility offers the most options and even has an empty building (X-3002) suitable for storing the uranium material. The proposed action is consistent with the current mission at Portsmouth. Storing the uranium material at Portsmouth also avoids transfer of materials across state lines.

Receipt and storage of these materials is not consistent with the current ETTP mission. The Oak Ridge public and the Tennessee state regulators are increasingly unwilling to accept the continued storage of the depleted UF6 at ETTP, as there is no defined use for the material in the foreseeable future and the cylinders require ongoing surveillance and maintenance to ensure that they are not breached. DOE should not propose storage of additional depleted uranium when the existing stockpile is destined for removal and/or conversion to a stable oxide form.

Most of the uranium is depleted (2761 metric tons); locating it at Y-12 in its doubly secure area is not in keeping with the current Y-12 mission. However, locating the 799 metric tons of low-enriched uranium (LEU) at Y-12 until its sale is finalized appears commensurate with the plant's mission.

The Paducah site is limited in space and has increased earthquake and wind hazards. The action is otherwise consistent with its mission, although it is a less advantageous location than Portsmouth for these reasons and due to the transportation distance.

Response: Comments on the various alternatives sites and reasons for recommending Portsmouth are noted.

Mr. Ronald Lamb 10990 Ogden Landing Road Kevil, KY 42053

I wish to submit my comments on the Fernald EA. There are several reasons for not moving the uranium metal to Paducah. The first is Paducah is a small site and has more than our fair share of waste, such as 40,000 cylinders of our own and several tons of scrap metals. Paducah does not have a facility to store this metal and would have to build one. The second reason is that the Paducah plant is near the New Madrid earthquake zone. Geologists predict a severe quake to strike the region in the next few years. For this reason the Paducah plant should move our waste out of the region. I feel certain that the Department of Energy would disagree since a lot of our waste lies in 14 ton cylinders, but these cylinders have small 2 inch fill valves with very little protection. I feel there will be a numerous breaches of these fill valves during an earthquake. I believe we should be reducing the waste at Paducah instead of bringing more to this area for storage. I have included information of the fault from the earthquake consortium and a list of seismic data activity.

Response: The uranium materials are considered by DOE to be valuable product, not waste. DOE appreciates the information supplied on the New Madrid Fault. Seismic activity was considered in the accident analysis for this EA.

Paducah Gaseous Diffusion Plant Site Specific Advisory Board

General Comments:

1. The Paducah SSAB recommends that Fernald pursue amendments to the appropriate regulatory documents allowing the uranium materials to be retained at the Fernald site pending resolution of the long-term disposition strategy.

Notwithstanding this recommendation, if the DOE decides to move the uranium materials, the Paducah SSAB recommends that the uranium materials should be moved the least distance possible to reduce the environmental impact of transportation hazards.

Response: DOE must move these materials in order to comply with a state of Ohio regulatory commitment. Recommendation for reducing transportation hazards noted.

Specific Comments:

2. Page 2-7: Drawing is out of date even though it says rev. 1/20/99. There are buildings and pads in the general area designated for the storage area.

Response: Figure updated to show some additional buildings and pads in this general area; however, the area proposed for the storage of uranium is an open field.

3. Page 2-11, Paragraph 1: What is the benefit of using a combination of sites?

Response: There are several possible advantages. The risk of accidental release due to fire or other natural events is lessened somewhat by having materials in different locations. Some plants, such as Y-12, are already storing LEU and it would be comparatively easy administratively to add more LEU at Y-12 than some of the other inventory materials. Also using a combination of sites could result in using existing buildings to a greater extent than might otherwise be the case, negating the need for greater ground disturbance associated with TSS construction.

4. Page 2-11, Paragraph 2: The first sentence appears to be poor planning, not a justification for not considering commercial facilities.

Response: Comment noted.

- 5. Page 2-11, Paragraph 4: "to support compliance with regulatory requirement" seems to use this as an excuse for poor planning and as a hammer to make something happen. Response: Comment noted.
- 6. Page 3-6, Paragraph 4: Change "PGDP" to "DOE" reservation." Response: Sentence modified to "PGDP reservation".
- 7. Page 3-6, Paragraph 5: Where did these numbers come from? Is this 1992 data? Response: Numbers came from the Final Programmatic Environmental Impact Statement for Managing Treatment, Storage, and Disposal of Radioactive and Hazardous Waste (DOE/EIS-0200-F).
- 8. Page 3-6, Paragraph 6: Using 1992 data seems outdated. Response: Comment noted.
- 9. Page 3-6, Paragraph 7: Why not look at 1998 or even 1997 radionuclides sources rather than 1992? If you bother checking, we believe you will find the vapor degreasers in C-400 are no longer operating. Didn't anyone visit the site or talk to the people at the Paducah Site?

Response: text has been updated to cite information from the USEC SAR dated December 15, 1997. Corrected text includes removal of the vapor degreasers in C-400 as an emission source since they are now out of operation.

- 10. Page 3-7, Paragraph 2: Check on numbers of plumes—believe there are 3 now (major or minor?). Response: There are two major ground water plumes generally recognized at the plant.
- 11. Page 3-7, Paragraph 5: List source of the identification of the federally listed species. A 1994 Corp Study did not list the evening bat in this area and identified the pearly mussel as endangered. Also, none of these species should be included.

Response: DOE is consulting with the U. S. Fish and Wildlife Service and state fish and game departments regarding any potential adverse impact to protected species.

- 12. Page 3-8, Paragraph 4: Sewage is treated "onsite" not "offsite." Response: Text modified.
- 13. Page 3-8, Paragraph 5: The Corp has performed a cultural resources survey. I believe it was completed in 1994.

Response: The Corps of Engineers archaeological survey covered the area outside the immediate plant boundary. There has been no systematic cultural resources survey completed which addresses resources within the plant boundary and covers historic buildings and well as archaeological sites. Text not modified.

14. Page 4-5, Paragraph 4: What about waste from the construction/site preparation. I believe soil in that area is PCB contaminated. There are building and pads that are not depicted on your map, will their existence change preferred location?

Response: Possibly there are traces of PCBs in the soil but nothing of significance. The construction of concrete pads over any soil would have the effect of reducing mobility of soil contaminants.

15. Page 4-9, Paragraph 3: I believe USEC might disagree that cleanup is the major priority at the site. I would like the source of the baseline identified and a list of "future changes."

Response: The baseline refers to the environmental baseline discussed in the Affected Environment chapter.

16. Page 5-1: Why wasn't up-to-date information about Paducah used?

Response: Sources used ranged from publication dates of 1990 to 1998. Some later information has been considered.

17. Page 6-1: Appears "walk-downs" were performed at Portsmouth and Fernald, why not Paducah and Oak

Response: Building walk-downs were done at various sites but not Paducah. PGDP personnel provided a map location of a brownfield site (open area); it was assumed there would be little gained by a special trip to view such a site.

18. Page B-9, Paragraph 6: What goes in the blank?

Response: This breathing rate is based on recommendations from the International Commission on Radiological Protection. This source information has been added.

19. The information used was significantly out of date, and in some cases, totally incorrect. The general impression of this project is that Fernald has a regulatory driver and it will be met. How long has this project been going on? It appears this part of the project is being rushed.

Response: Comment addressed above.

Mary Byrd Davis Yggdrasil Institute P.O. Box 131 Georgetown, KY 40324

1. I believe that the 3800 metric tons of depleted uranium now at Fernald should stay where they are until they are sold, rather than be moved to any of the alternative sites. Surely the agreement between the Department of Energy and the State of Ohio can be amended to make this common sense step possible. If the material is valuable, can it not be sold within a short time period?

Response: Comment noted. DOE does not project transfer to DOD within the regulatory time period

2. The storage at the alternative sites may not itself involve risks, but there is always risk in transportation. The tonnage involved would mean a major shipping initiative. Furthermore, transportation would mean a waste of resources: the consumption of fossil fuels and the consequent increase air pollution. Response: These risks were examined earlier and found to be minor.

Diana Cahall 7019 Ashridge Arnhelm Road Sardinia, Ohio 45171

Note: Due to the length of several comments, they are summarized here. The reader can find the full text of Ms. Cahall's comments in the letters/comments portion of this appendix.

- 1. Although I definitely feel that a 30 day comment period fails to provide sufficient time for public review and comment by all parties who have an interest in the proposed action, extension of the public comment period does provide opportunity for limited review and participation by a few members of the public other than those representing the interests of the Fernald Environmental Project Site (FEMP).

 Comment noted.
- 2. The commentor provided several paragraphs dealing with the proposed sale of uranium and the failure of DOE to properly declare this material "excess".

Response: The uranium meets DOE's mission if not FEMP's. DOE expects much of the material to be transferred via an interagency transfer to the DOD. At the present time, the uranium is not "excess"; should any be declared excess in the future, then public notification would occur at that time.

3. DOE cannot reasonably assert that materials with hazardous and toxic characteristics can be safely isolated from the human and natural environment simply by calling them "nuclear materials" with an economic value rather than waste.

Response: DOE makes no such assertion. The EA evaluates the potential impacts to the human and natural environment under both normal operating conditions and under accident conditions at each of the possible storage sites.

4. Draft EA defines the economic impact of the proposed action much too narrowly. A structure to temporarily store 3,800 metric tons of nuclear materials at other DOE sites until sale of transfer does not address the total foreseeable economic impacts of the DOE action. Five million dollars and three new worker jobs to monitor materials in the interim fails to include: (1) packaging costs for transport from FEMP, (2) transportation costs to one or more of DOE's candidate receiving sites, (3) transportation from the candidate/host site, (4) revenue from the sale of the materials, (5) cost to construct the other facilities required by "disposition" of these nuclear materials to private, commercial ventures and (6) remediation/cleanup of nuclear waste disposal costs from the operation of commercial reuse or recycling/reprocessing facilities which DOE reasonably can foresee and predict to result from the proposed action.

Response: Items 1 and 2 were dealt with in the CERCLA ROD for FEMP. Transportation from the candidate site is the responsibility of another federal agency, such as the Department of Defense, should they acquire the materials. At present, commercial ventures cannot buy the material; another federal agency could acquire it via an interagency transfer. Thus sales revenues would not occur. Regarding impacts associated with use by another agency, any such impacts would have to be addressed by the respective agency when and if they acquire the materials. DOE cannot predict who would acquire what materials, where the materials would go, what specific uses they would be put or how decontamination might occur after transfer and use.

- 5. DOE is mandated to comply with Executive Order 12866, and all others. Response: Comment noted.
- 6. DOE has failed to consider the direct and indirect foreseeable impacts of the proposed action, including the considerable long and short term costs, risks to the public and worker safety, and environmental consequences in draft EA.

Response: DOE disagrees with this statement. The EA evaluated pertinent direct and indirect effects and in particular focused on public and worker safety (see Appendix B).

7. Note that EA presents dose calculations based upon incomplete/missing data.	Breathing rate of 3.3 E-4
m3/s based on	

3512

This rate is based on recommendations from the International Commission on Radiological Protection. This source information has been added.

8. Transportation is an obvious requirement/result of the proposed action, as in the impacts associate with transfer. Communities along the transportation routes are not even mentioned in passing (by rail or truck) in DOE EA.

Response: Transportation impacts have already been considered in previous documentation. DOE decided to provide an addendum to the DEA in order to address any transportation-related concerns. This information has been incorporated into a new appendix and included as part of the FEA.

9. Conclusion of the Transportation Addendum provides no meaningful information whatsoever about what is being moved, where the material is being moved from (ORO may be a misprint) since all other transportation discussion is focused upon removal of nuclear materials from the FEMP site as part of remediation activities of the site), what standards of protection and regulation apply and how DOE proposes to comply.....

Response: In section 1.1 DOE indicated that 3800 metric tons of uranium material is to be moved from the FEMP to another ORO site. Paragraph 5 of the Addendum explained that "all material shipped from FEMP will be packaged in accordance with Title 49 Code of Federal Regulations. In paragraph 6, DOE declares it intention to move the materials "in DOE-approved packaging, subject to DOE radiation, contamination or fissile controls and other Federal or State requirements".

10. DOE is being disingenuous in multiple failures to address transportation in a manner compliant with agency policy and guidelines. DOE cannot avoid addressing transportation due to implementation of transportation requirement in DOE proposed action by an outside/independent contractor. DOE and other agencies should not attempt to avoid disclosure of the total plan by hiding "the plan" behind Fernald/FEMP cleanup which is precisely what has been attempted in draft EA.

Response: On the contrary, DOE has already evaluated transportation as part of the integrated CERCLA/NEPA process. This process had full public involvement. Transportation-related impacts were identified as minor. Therefore, DOE chose to focus on the receipt and storage of these uranium materials at other ORO sites since that analysis had not been previously performed.

11. Scope of EA is narrowly focused upon movement of nuclear materials from FEMP site as a part of the site's remediation while failing to address and disclose what disposition is proposed for these materials after they are shipped from FEMP to other DOE site(s). DOE actions and intentions require full explanation in final EA.

Response: DOE has properly focused on analyzing the potential environmental impacts of receipt and storage of uranium materials at one or more ORO sites. DOE has no specific agreements in place to transfer these materials to a third party. Until final use is determined, DOE cannot where or precisely how the materials would be used. As appropriate, DOE will determine the level of NEPA action required for subsequent actions.

12. "Commitments made to the state of Ohio" require full explanation. Both DOE and state of Ohio have failed to disclose the commitments which cause the actions proposed in the EA to occur, and would provide information as to the total scope and purpose of the proposed action(s).

Response: The statements referring to commitments made to the State of Ohio actually addresses both direct and indirect commitments made to both the U.S. EPA and Ohio EPA. In 1993 plans and budgets were developed and put into place to address the disposition issues associated with the Nuclear Materials. In this same time frame, Records of Decision for the various Operable Units were being drafted to address the cleanup efforts at the site. The Nuclear Material Disposition Project represented a significant impediment to the D&D and soil remediation schedules, therefore, as a result

commitments were made to the state and federal regulatory agencies concerning the removal of nuclear materials from the FEMP. In this period of time, from 1993 through 1998 more than 5 million pounds of nuclear materials were removed from the FEMP, however there still remains more than 10 million pounds (4700 MTU) of nuclear materials that need to be dispositioned. In late 1998 DOE-FEMP committed to both the U.S.EPA and OEPA that a firm date for removal of all of the nuclear material would be provided by April 1, 1999. Schedules and budgets are currently being developed to provide the firm date to the regulators by this date.

13. DOE is required to notify interested and adversely affected parties by legal notification process. How and when was this done? I can find no public notification of draft EA's availability for public comment in the federal register or in legal notice in subscription newspapers available within the Brown County, Ohio area which properly notified the public of any proposed agency transport of nuclear (fissile) materials through local communities.

Response: Public notices were published in late January (January 21 for most papers) in several local newspapers including the Oak Ridger, Knoxville News Sentinel, Portsmouth Daily Times, Paducah Sun, and Hamilton Journal News. In addition, at this same time DOE sent news releases to local TV and radio stations regarding availability of the EA. The news releases were also sent to the following news papers—the Jackson Times Journal, the Chillicothe Gazette, Pike County News Watchman, Portsmouth Daily Times Columbus Dispatch, Cincinnati Enquirer, and the Louisville Courier Journal.

14. DOE is requested to prepare program-wide EA/EIS which address the major federal actions being proposed for implementation in draft EA.

Response: Comment noted.

15. DOE is also required to comply with Executive Order 12898, February 16, 1994 which mandates federal agencies to avoid actions resulting in disproportionate adverse environmental and health impacts in low-income and minority communities.

Response: Socioeconomics and Environmental Justice were addressed for each of the DOE/ORO sites (see sections 3.1.6, 3.2.6, 3.3.6, 3.4.6, and 3.5.6) and corresponding impacts sections.

16. Given the arbitrary nature of the process used by DOE to date in declaring "excess property" in inventory, statement of DOE intent is required in final EA. DOE has considerable reason to predict that implementation of FEMP environmental management and restoration will likely result in the FEMP site (land) becoming excess real property. What are the agency's intentions after remediation is completed at FEMP?

Response: That decision is beyond the scope of this EA.

17. Current proposals for FEMP future uses include giving the FEMP site back to the Indians. Does DOE intend to use FEMP as a "pilot program" for giving other DOE/federally owned sites /land back to Native Americans, including the Hanford site in Washington state?

Response: Approximately 1050 acres of FEMP land is being evaluated for alternative uses. DOE is being assisted in this process by local groups and other agencies. A majority (884 acres) is proposed to undergo natural resource restoration. A 23-acre plot in the south-central portion of the site may be set-aside for potential commercial development. No final decisions on land reuse have been made at this time.

18. The agency has failed to include data necessary to justify a finding of no significant impact.

Response: DOE has analyzed the potential environmental impacts of receipt and storage of 3800 metric tons uranium at several ORO sites. Both normal operations and accident situations have been

examined. No significant environmental impacts have been identified. Some site locations pose more exposure risk than others.

19. DOE is capable of applying considerably higher standards of agency review and oversight and is herein requested to do so.

Response: Comment noted.

Gregory L. Simonton SODI Executive Director Southern Ohio Diversification Initiative 1864 Shyville Road Piketon, OH 45661

RE: USDOE Fernald Material Relocation

The Southern Ohio Diversification Initiative (SODI) wishes to make comments regarding the destination of material from the USDOE Fernald Site, especially related to the USDOE Portsmouth Site.

1. The SODI is working cooperatively with the local communities and the Department of Energy to develop and implement programs that will lessen the impacts resulting from the reductions of employment at the local site. A central theme, and the key to our long -term transition success, is the reuse of buildings, lands, and equipment located on the Portsmouth Reservation.

We believe that relocating the material from Fernald to the Portsmouth Site negatively impacts our reindustrialization efforts. Public perception will play a vital role in our marketing program and reuse success, both of which are targeting a variety of companies to diversify our regional economy.

We recognize the Department of Energy has obligations with the regulatory agency(s) concerning removal of the Fernald material. With that in mind, we make the following recommendations:

Any material transferred to the Portsmouth Site should not be stored in facilities with a viable potential for reuse and alternate job creation. Specifically, any facility targeted for storage should be reviewed and approved by the SODI-DOE's designated Community Reuse Organization. This will ensure the negative impacts to our Re-industrialization Strategy will be minimized.

Buildings X-3002, 3001, 3346, 3000, 1000 (and other facilities) are initial priorities for our Reindustrialization Strategy and should not be considered for Fernald material storage.

If Portsmouth is to receive a portion of the Fernald material, new facilities should be constructed to house the same.

Response: Comments and recommendations are noted.

William M. Pardue, Chair
Oak Ridge Reservation Environmental Management
Site Specific Advisory Board
Oak Ridge, TN 37830

In analyzing the relative appropriateness of Oak Ridge Operations (ORO) for the receipt and storage of uranium materials from the Fernald Environmental Management Project Site:

1. The distance from Poplar Creek to prospective storage sites at East Tennessee Technology Park (ETTP) is discussed, but the elevation above creek level and flooding history were not mentioned.

Response: Information in section 3.5.3 indicates that most of the ETTP site is above the probable maximum flood. Text has been added to specifically state that all proposed storage locations at ETTP are above the 100-year flood level. According to the USGS topographic map for ETTP (DOE 1999), storage location K-131/K-631 elevation is approximately 780 ft, which is about 40 feet above the Poplar Creek level of 735-740 ft. The open area location elevation is about 760 ft, some 20 feet above the Poplar Creek level. Storage location K-1066 F elevation is also approximately 780 feet.

Water levels in Poplar Creek, which is a tributary of the Clinch River, are controlled to a large extent by Melton Hill Dam approximately 18 km (11 miles) upstream from the confluence of Poplar Creek and the Clinch River. All three locations are outside the 100-year flood plain boundary of Poplar Creek.

2. No information is given on the average isotopic composition of the depleted uranium (U) present. If the U has nearly natural composition, then the material could compete as feed for gaseous diffusion. If it has the 0.3 or 0.4% U-235 content usual for depleted uranium, the likelihood of sale in the near future may be small.

Response: For the purposes of the risk assessment, as stated on page B-9 of the Draft EA, for normal and depleted uranium is considered to be no more than 0.71% U235. This value is considered conservative. The uranium materials discussed in this EA or slated to be marketed or used.

- 3. How did this project become such an emergency that work must be completed this year, with the result that stakeholders are prevented from having the opportunity for meaningful input?

 Response: The public has opportunity for meaningful input.
- 4. Why did DOE-ORO agree to accept the material before the EA was made available? Response: DOE determined that the uranium material was a valuable product and its safe storage and eventual use was appropriate to DOE's mission.
- 5. It appears that the facility at Portsmouth is a more appropriate site for storage:
- An appropriate site at Portsmouth (X-3002) has been identified where the material can be accommodated.
- Storage of this material is consistent with the Portsmouth mission; it is inconsistent with the current mission at ETTP.
- At Portsmouth, the material will stay within the same regulatory framework as at present.
- The State of Tennessee (TDEC) has reached agreement with DOE to remove stores of depleted uranium hexafluoride from ETTP within the next ten years. There is little sense in shipping a supply of a different fluoride to Tennessee in the near future.

Response: Comment noted.

Earl C. Leming
Director/State of Tennessee
Department Of Environment and Conservation
DOE Oversight Division
761 Emory Valley Road
Oak Ridge, Tennessee 37830

The Tennessee Department of Environment and Conservation, DOE Oversight Division (TDEC/DOE-O) has reviewed the subject document in accordance with the requirements of the National Environmental Policy Act (NEPA) and associative regulations of 40 CR 1500-1508 and 10 CFR 1021 as implemented.

The State of Tennessee strongly supports the Defense and National Security missions on the Oak Ridge Reservation. The State has not supported use of the Oak Ridge Reservation for storage off offsite materials that have no identified future use or may be declared a waste at some future date.

The Draft EA appears to propose a Monitored Retrievable Storage Facility (MRS) at a site other than Fernald. The Draft EA has not demonstrated that such a facility meets present or future Defense Programs needs for the material or other national security interest, nor has it provided sufficient information to allow the State to consider the overall positive and negative impacts resulting from a transfer of the materials to Oak Ridge.

The Division appreciates the early interaction with the DOE on this issue. We believe cooperation and issue resolution is more likely when the State is involved early in the NEPA process. We would like to see this process continued.

Enclosed for your review and response are general and specific comments.

Response: Comments are addressed individually below.

Tennessee Department of Environment and Conservation/DOE-Oversight Comments on the Draft Environmental Assessment DOE/ORO-2078, February 1, 1999
The U.S. Department of Energy, Oak Ridge Operations
Receipt and Storage of Uranium
Material from the Fernald Environmental Management Project Site

General Comments:

1. In order to reasonably assess whether the Fernald material is an asset material required for Defense needs or other national security considerations the EA should provide information on existing complex wide inventories of similar material and how much has been transferred over the past five years to the Department of Defense or "other interests."

Response: As stated in the EA, FEMP has reduced its uranium inventory form 14,500 to approximatley 6,800 metric tons over the past 6 to 8 years. There have been expressions of interest in acquiring the 3,800 MTU product by both private concerns and other federal agencies. Currently there is a temporary moratorium on sales of uranium to private concerns; however, DOE can transfer the material to another agency as the need arises.

2. The EA does not describe a contingency plan for the storage and eventual disposition of this material in case no markets are developed. Although the EA states on page 1-1 there is an "interest" the material is "potentially marketable," and it is in the best interest of DOE to "eventually market or use" the material, DOE may require long-term management of the material. The draft EA risk analysis indicates that a container breach would occur primarily from long-term corrosion. Without proper storage and maintenance the material from Fernald could experience corrosion. The DOE should avoid this situation with the Fernald material by planning for adequate funding for storage and maintenance. The EA should address associated cost for transportation, long term storage, and disposition (including disposal). It should also address any plans for cost recovery through sales or other forms of revenue exchange. The EA should clearly identify the DOE program, which would be responsible for the material and that programs funding assurance or needs to properly store, maintain, and disposition the material. It should also address future decontamination and decommissioning cost of equipment and facilities.

Response: DOE-ORO carefully evaluated the FEMP materials and determined what materials were waste and what were product. DOE anticipates an economic or interagency use for the product analyzed in this EA.

3. The draft EA is inconsistent in many areas of consideration. A description of existing, contamination, fire suppression systems, and ventilation was provided for some candidate site buildings, while the buildings at Y-12 and ETTP did not receive the same consideration. Some proposed areas were evaluated as flood zones while areas at Y-12 and ETTP did not have the same evaluation. Other sites were evaluated for upgrades to facilities while there were no assessments done for the buildings at Y-12 and ETTP. In order to evaluate this document for issuance of an EIS or FONSI, complete and consistent information must be provided.

Response: While some buildings have fire suppression and other systems, DOE took no credit for these systems during a potential accident event. As noted on page B-6 of the Draft EA—"all facility structures are assumed to be destroyed and nothing but rubble remains. All utilities are lost." DOE believes this approach is conservative. It removes uncertainties from the analysis associated with the whether and/or how well a particular fire suppression system may operate during an emergency or the degree to which a particular building can withstand an earthquake or other natural disaster.

4. It has been indicated that material exists in the inventory that requires a Nuclear Category 2-storage facility. The category should be described and the site(s) under consideration evaluated to determine if they meet the same nuclear category or what will be required to upgrade the facilities to a Category 2. The amount of material requiring Nuclear Category 2 storage must also be identified.

Response: The term Nuclear Category 2 refers to the inventory of material and not to the building or storage facility capability.

5. The radioactive contamination levels of candidate buildings must be described. The presentation made to this Division clearly indicated that the material from Fernald would be in clean packages, i.e.: free from external contamination, and would be placed in "pristine" facilities.

Response: It is DOE's intent to place the FEMP materials in clean facilities. Buildings that do not or cannot be made to met this criterion in the time needed will not be used.

6. The transportation evaluations for moving the material were absent from the draft EA and provided only after request. If the containers are transported off site, they must be evaluated for transport suitability, as the document states there have been problems with long-term corrosion.

Response: This information is in Appendix A. All material proposed to be shipped from FEMP would be packaged in accordance with Title 49 CFR. Outbound shipments will move in DOE-approved packaging, subject to DOE radiation, contamination or fissile controls and other DOE Federal or state requirements.

7. The EA must address the inspection and maintenance programs that have allowed the long-term corrosion to occur. The final EA should include all incidents of container breaches and releases of material. The final EA should also describe the storage containers including type and thickness of metal.

Response: The FEMP materials will be repackaged or refurbished to meet DOT requirements for shipment. The materials will be under a surveillance program, which meets or exceeds DOE requirements.

8. Requested funding in FY 2000 to upgrade the existing facilities at Y-12 for storage of highly enriched uranium has been cut. Additional material stored in substandard facilities increases the risk of release to the environment and exposure to the public. It does not appear the risk analysis used substandard facilities in the evaluation.

Response: As noted above, DOE took no credit for building integrity in the event of a natural disaster.

9. At the request of Tennessee, DOE has imposed a limit for storage of LEU at 6 MTU for the Y-12 site. No inventory above that limit is allowed as specified in the Finding of No Significant Impact (FONSI) for the Environmental Assessment (EA) of the "Proposed Interim Storage of Enriched Uranium Above Maximum Historical Storage Level at Y-12 Plant, Oak Ridge, Tennessee."

Response: Comment noted.

Specific Comments:

10. Page 1-1, Section 1.1 PURPOSE AND NEED FOR THE PROPOSED ACTION

"Of the remaining inventory there are approximately 3800 metric tons of potentially marketable material...." This remaining 3000 metric tons of uranium material that is not potentially marketable should be considered waste.

Response: It is considered waste and is being dealt with accordingly.

11. Page 2-1, Section 2.1 BACKGROUND

"...an area where at least two tension-support structures..."

The EA should clearly indicate that these are temporary tent-like structures and not permanent buildings.

Response: The EA notes that the TSSs would have tarpaulin roofs and sides.

12. Page 2-8, 2.5 Y-12 Plant

The Nuclear Category level and contamination levels (if levels exist) of the buildings should be described. Response: The Nuclear Category level refers to the inventory and not to the building/facility.

13. Page 2-8, 2.6-1 K-1066F Area

The draft EA should specifically state whether the K-1066F area is or is not within a flood zone.

Response: A sentence has been added to section 3.5.3, which states that all proposed storage locations at ETTP are above the 100-year flood level.

14. Page 2-8, 2.6-2 K-131 and K-631 Buildings

The "Remedial Investigation Report for the East Tennessee Technology Park, Oak Ridge, Tennessee, Volume 5" does not list K-131 as having a basement. Additionally, both buildings are listed as having contamination areas, failing a screen for the report, and requiring further evaluation in the feasibility study. These buildings are currently listed on a decontamination and decommissioning list. During the presentation made to the Division, it was stated by DOE that the storage of this material was to be "pristine" facilities. Storage in contaminated buildings would not meet that goal.

Response: Buildings would only be used if they were "clean". DOE would not use contaminated buildings. It is unlikely that these specific buildings could meet programmatic requirements for storage of this uranium.

15. "These buildings are approximately 200 ft south of Poplar Creek at its closest point." Explain the significance of this statement in terms of flooding.

Response: See response to comment 13 above.

16. Provide information for the meaning of "nominal" in the statement

"The nominal basement size is 22,765 ft...."

Response: The usable, available space in a building can be slightly smaller than the actual/nominal square footage.

17. Page 2-1, 2.8.1 Commercial Facilities

The requirement to have all the uranium removed from the FEMP site by September 30, 1999, should be cited. Although the draft EA states there "was not enough time to prepare and issue a competitive request for proposal..." the DOE has known for some time this material needed to be removed from the FEMP site. Response: Comment noted.

18. Page 3-3 and 3-11, Table 3.1 and Table 3.4

A comparison of Table 3.1 and 3.4 indicates that Cincinnati was included for the Fernald site analysis, but Knoxville was not included in the Oak Ridge site analysis. Knoxville is as close to Oak Ridge as Cincinnati is to Fernald, therefore, Knoxville should have been included in the analysis of the Oak Ridge sites.

Response: The Draft EA indicated that the socioeconomic region of influence for FEMP could either be Hamilton County, Ohio or the Cincinnati Metropolitan Statistical Area. DOE chose to include data form both areas. Given the small potential economic impact associated with the proposed action, inclusion of Knoxville data would make no difference to the analysis or conclusions.

19. Page 3-9, Section 3.4.2 Climate and Air Quality

"For radiological pollutants, emissions are variable and emanate mostly from the TSCA incinerator." TSCA is not the primary source of radiological emissions. In the 1997 ASER, less than one Curie of radiation was reported as being emitted from the TSCA stack. Over 10,000 Curies were reported as being emitted from the HFIR stack. Only .013 Curies of uranium were released from Y-12 during 1997; however, Y-12 was still in "stand-down" mode. The most effected individual for the ORR was closest to the HFIR stack not the TSCA stack. Please revise this section to reflect the above statistics.

Response: Text corrected.

20. Page 3-9, Section 3.4.1 Public and Worker Risk

Y-12 should have the same considerations as Portsmouth and Paducah sites for "radiation dose from airborne radionuclides..." and "collective radiological dose from airborne emissions..." The document is inconsistent in its evaluations.

Response: Information added to text.

21. Page 3-9, 3.4.3 Water Resources

Floodplains are not addressed nor is groundwater. This section is inconsistent in evaluation with other sites' sections.

Response: Text added.

22. Page 3-10, 3.4.5 Ecological Resources

Lake Reality is not considered waters of the State and is a man-made, spill containment pond that has heavy mercury and PCB contamination. Its location is now adjacent to Upper East Fork Poplar Creek.

Response: Comment noted.

23. Page 3-11, Section 3.5 EAST TENNESSEE TECHNOLOGY PARK (formerly K-25 Site)

This section discusses the East Tennessee Technology Park (ETTP) as a possible site. The ETTP is being re-industrialized. The use of the site as a storage area for Uranium material does not appear to meet the current mission for the ETTP. The EA should address the D&D Trust Fund which is the main source of funding for ETTP operations and how ETTP funds would be used to store and disposition the Fernald material.

Response: Through 2001 monies to meet the proposed action would come form the FEMP budget. After 2001, funding will be presented as part of DOE-ORO budget request but separate from the D & D Trust Fund.

24. Page 3-11, Table 3.4

Please explain what the "Fernald Region of Influence" (in table title) means and how it impacts Anderson and Roane counties. The "Fernald Region of Influence" is also mentioned in Tables 3.2 and 3.3.

Response: Table titles have been corrected.

25. Page 3-11, 3.5.1 Public and Worker Risk

ETTP should have the same considerations as the Portsmouth and Paducah sites for "radiation dose from airborne radionuclides..." Again, the document is inconsistent in its evaluations.

Response: Text added.

26. Page 3-12, 3.5.3 Water Resources, Surface Water

"...most of ETTP is above maximum flood level" does not adequately describe the potential for flooding at proposed storage sites. Flood levels are measured in terms of "X" year floods, that is, a 25-year flood will reach a certain elevation above sea level in a certain location, while a 100-year flood will reach a higher

elevation in the same location. The proposed locations for this material are located near Poplar Creek. The paragraph should provide specific information whether or not a flood could inundate the area and the flood plain year (25, 100, etc.)

Response: Requested information added.

27. Page 3-12, 3.5.3 Water Resources, Groundwater

"...conduit-dominated flow has been confirmed only in portions underlain by Knox carbonate along Black Oak Ridge." One-third of all bedrock wells at ETTP intersects cavities, which are generally water-filled. At least one of the proposed locations had adjacent dolines shown on topographic and geologic maps of the area. Conduit flow should be and is the base assumption for unconfined carbonate aquifers such as those that underlie the ETTP proposed storage sites. The fact that conduit flow has only been delineated in one area at ETTP should not be used to imply that conduit flow does not exist in other carbonate units beneath the site.

Response: Comment noted. DOE considered all activities associated with the proposed action including both normal operations and accident conditions. Surface and ground water resources would not be adversely affected.

28. Page 4-1, 4.1 Public and Worker Risk, first paragraph

Provide information for the statement "In addition, the initial assessment to determine..." specifically outlining what is meant by "a review of the fate of the uranium in the off-site environment..." Also provide information as to where this assessment appears in the appendices.

Response: Accidental release of uranium has been evaluated for each site. Additional information on metal toxicity was added to the EA in section 4.0 and text revised.

29. Page 4-2, 4.1 Public and Worker Risk, first and second paragraph

"Uranium that is released from primary and secondary containment..." It appears that the modeling did not use the tension support structures proposed for storage of this material.

Response: As noted in the response to comment #3 above, DOE took no credit for building integrity during a seismic-fire event. Thus releases during these accident conditions are assumed to be the same for a permanent brick-and-mortar building as for a TSS. This assumption is environmentally conservative and likely over estimates adverse effects in many situations.

30. Page 4-8, 4.6.1 Normal Operations, fifth paragraph

"... Workers could be exposed to direct radiation from surface contamination"

Storage containers should not have any surface contamination. The DOE's original presentation to this Division stressed the packages would be clean and kept in a clean environment. Although these packages may be stored on brown field areas, they are not scheduled to be in any type of secondary containment building. Containers should be free of contamination to prevent release of surface contamination to areas outside the designated storage.

Response: This is correct; storage containers should not have any surface contamination and the EA notes the precautions taken to prevent such an occurrence.

31. Page A-3, Appendix A

To prevent moving the material twice or more, the 193 MTU of normal uranium scheduled to be used for blend stock should be moved directly to the sites using the material. Furthermore, if other users for the inventory are identified, the material should be transported directly from Fernald to the user to avoid transporting twice. The total pounds and MTU amounts do not match the total s given on page A-4 and Table B.1

Response: Comment noted.

32. Page A-5, Appendix A

The chart is describing "depleted" uranium but the total is stated for "all normal."

Response: Chart corrected.

33. Page B-4, Appendix B, Table B.1

The inventory amounts for the total normal uranium MTU do not match the amount listed in Appendix A, page A-3. The total low-enriched uranium pound amount does not match the amount listed in Appendix A, page A-7.

Response: Comment noted.

34. Page B-6, Table B.4

The tornado wind speed for Oak Ridge is less than Fernald and Paducah. How was the wind speed determined, and why was it less for Oak Ridge?

Response: The source document for these data were added to the appendix. The information is based on historical data. A variety of factors determine tornado wind speed; however, the hilly topography in the Oak Ridge area is a likely contributor to lower wind speeds other areas with flatter terrain.

35. Page B-6, Appendix B, page B-5, Table B.2, and Container Breach

It is listed that an accident involving a container breach due to corrosion or degradation of the storage containers could occur. The condition and age of the storage containers should be fully examined and included in the final EA. The material also needs to be fully evaluated for transportation in the final EA. Response: Virtually all containers are new and in excellent condition. The T-hoppers are older but are very thick walled vessels. All containers will meet DOE transportation requirements. The containers are proposed to be stored in the dry in buildings or Tension Support Structures. The uranium is relatively inert, insoluble, and non-corrosive. Container breach would most likely under an accident scenario rather than from corrosion.

36. Page B-7, Appendix B, third paragraph

"...it is assumed that the uranium storage facility is a Hazard Category 2 facility..." The hazard analysis appears to assess storage in a Hazard Category 2 facility but not storage in the tension-support structures (TSS) or outside storage pads.

Response: see response to comment #12 above.

37. Page B-9, Appendix B

Please explain the blank line for the first bullet regarding breathing rate.

Response: This rate is based on recommendations from the International Commission on Radiological Protection. This source information has been added.

38. Page B-15, Appendix B, Table B.8

The calculations for public dose needs to be re-evaluated as the ETTP site is undergoing re-industrialization, members of the public are not restricted to outside the site fence boundaries.

Response: Industrial workers are treated in the assessment as workers or co-located workers.

Ms. Joelle Key
Health Physicist
Department of Environment and Conservation
Division of Radiological Health
3rd Floor, L & C Annex
401 Church Street
Nashville, TN 37243-1532

Thank you for the opportunity to review the Environmental Assessment for the Receipt and Storage of Uranium Materials from Fernald Environmental Management Project Site. The Division of Radiological Health has the following comments about this document:

1. There are a number of special security considerations for the movement and storage of the LEU material. Since the Y-12 site currently stores some HEU and LEU, that site appears to be the best location for the storage of the LEU material if it is to be stored in Oak Ridge.

Response: Comment noted.

2. This proposal treats the uranium in question as a "product" but the only mention of an actual customer for the product is for the LEU. The State of Tennessee already contains hundreds of cylinders of Depleted Uranium in the form of UF6 which the Department insists can be marketed as a product, but for which they have been unable to find a buyer. While the UF6 situation is different because of the need to convert the uranium to a usable form, the situation is similar.

Response: The Department of Defense uses depleted uranium in certain weapon systems.

3. In the proposal to store the material at K-25, the "co-located worker" is considered to be closer than the member of the public. This is not an accurate assessment of this site. Due to the re-industrialization of the ETTP site members of the public work at and visit this site regularly. The concept of a "co-located worker" for non-radiation workers is a DOE fabrication and is not recognized elsewhere.

Response: DOE believes the assessment of industrial workers at re-industrialized facilities as colocated workers is accurate and appropriate.

4. The EA states that the intent is to get approval for storage of the material at "one or more site." If the intent of this statement is to leave several options open then we have no objection to this intention. If on the other hand the intention is to scatter the material to different sites then this causes us concern. Storing the DU and HEU at different sites may be necessary but scattering the DU material to various locations appears inefficient. For example, using more than one site would require that personnel be hired and trained to monitor the material at each of the sites. This does not appear to be the most efficient use of resources. Some of the sites being considered, such as the Y-12 site, do not have enough storage space for all of the material. If a site cannot contain all of the DU material, then we do not think it should be considered for storage of this material.

Response: Comment noted.

5. The accident assessment for the ETTP site and specifically for the K-1066F site describes the worst credible accident dose to the public as a low dose. The dose calculated is 1.26 rem. This should not be considered a low dose. Evacuation of the public is recommended at a projected dose of greater than 1 rem. Response: The methodology for risk and associated terminology used is presented in Appendix C.

6. On page B-9, the first bullet at the bottom of the page is incomplete. It contains a blank underlined space, which was most likely intended to be filled in. The information is included on the page but should also be included in the bulleted line.

Response: This rate is based on recommendations from the International Commission on Radiological Protection. This source information has been added.

7. On page B-11, a chart lists the distances to the site boundary from each building considered. This distance was used in the accident assessment as the distance to the nearest member of the public. Given the development of private enterprise on this site ETTP is a public site. Given this, the site boundary is not a reasonable measurement for this calculation for those three buildings. The accident assessment for all three buildings should be reevaluated, this includes the K1066F site which already represents the highest accident dose of 1.26 rem.

Response: DOE believes the assessment of industrial workers at re-industrialized facilities as colocated workers is accurate and appropriate. The boundaries to the public are correct.

8. Page B-13 includes a table that lists radiological consequence levels to the public and to workers and associates these with a descriptive word. A public dose ranging from >=0.1 rem to <5 rem is described as having low consequences. This seems an unreasonably high range for a low consequence dose.

Response: The methodology for risk and associated terminology used is presented in Appendix C.

9. Many of the proposed storage locations are not in the form of already existing buildings, but are empty lots on which Tension Support Structures (TSS) would be built. These buildings do not appear to be as secure as a real building. How reasonable is it to store this type of material in this type of building? Response: All the uranium product is packaged in containers suitable for transport and will be stored in this packaging. There is practically no risk during normal operations in any structures. During accident conditions, risks are minimal even taking into consideration that DOE takes no credit for containment by buildings during the seismic-fire event. Use of TSSs appears to be a viable method of storage. All buildings and TSSs are proposed in locations that are in DOE property protection areas and are thus secure.

E-26

MR. DAVID R AllEN

ORD NEPA COMPLIANCE OFFICER

DEPT OF ENERGY

OAK RIDGE OPERATIONS OFFICE

P.O. BOX 2001

OAK RIDGE, TENNESSEE 37831

DEAR MR. AllEN:

THANK YOU VERY MUCH FOR THE DRAFT DOE/ORD-2078. I WANT TO MAKE THE COMMISSION AWARE THAT I HAVE S'3 ACRES OF LAND 18 MILES EAST OF SIERRA BLANCA, TEXAS WHICH IS 88 MICES EAST OF ET PASO, TEXAS.

I KNOW THAT NUCLEAR WASTE IS BEING STORED HERE BY THE SIGNS ETC, AND A VISIT TO MY PROPERTY. I MAKE MY PROPER AVAILABLE AT A GOOD COST TO THE D.O.E, AND I KNOW A LOT OF OTHER ACREAGE WOULD BE AVAILABLE.

THANK YOU & PLEASE REPLY!

OFFICIAL FILE COPY AMESQ

Log No. <u>C 0139</u>

Date Received FEB 1 0 1999

File Code_____

Mr. Walter Frazier 2230 Russell Ave. West Portsmouth, Ohio 45663-6247

02-05-99

PH-1-740-858-2614

The V.S. Department of Energy Plan to make Wes Ferticky a falt and our lyperts say the big onl world happend any time and be a major descartor. We don't need one nore mucular wast in fact the needer



Mr. Alfred B. Puckett 6365 Bethel Ct. Rd. Kevil, KY 42053 PADUCAH, KY RIVOF 420 02713/98 153 T

AEPA Compliance Officer
Oak Rige oprations
SE-32
Po Box 2001
Ophillippelling

130 Oklahoma Avenue Oak Ridge, TN 37830 February 14, 1999

David R. Allen ORO NEPA Compliance Officer Dept. of Energy Oak Ridge Operations Office PO Box 2001 Oak Ridge, TN 37831-2001

Dear Mr. Allen:

Subject: Comment on EA for USDOE/ORO Receipt and Storage of Uranium Materials from the Fernald EM

Project Site.

The subject document has some notable deficiencies from the perspective of the attentive public concerned about decisions affecting the Oak Ridge environment:

- I found no information on the toxic effects of uranium other than the radioactivity.
- The reader is told of the distance from Poplar Creek of prospective storage locations at ETTP, but the elevation above creek level and flooding history were not mentioned.
- No information is given on the average isotopic composition of the depleted uranium present. If the U has nearly natural composition, then the material could compete as feed material for gaseous diffusion. If it has the 0.3 or 0.4 % U-235 content usual for depleted uranium, the likelihood of sale in the near future may be small.
- I could not readily determine the basis of the risk calculations. Statements about air concentrations near the ORR seem questionable. Pg. 3-1 suggests the normal background dose rate is 0.5 mrem/hr. Unusual!
- The description of hypothetical accidents was inconsistent or at least so obscure I could not follow it.

Since willingness of the public to accept risks from any project must depend on potential benefits or at least whether the project makes any sense, other questions intruded which need consideration in the final alternative selection:

- How on earth did this project become such an emergency that work must be completed this fiscal year, so adequate comment time cannot be afforded?
- Why did DOE/ORO agree to accept the material before the EA was made available?

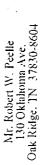
Regardless of the above points, it appears to this reader that the facility in Portsmouth is the logical choice for storage because:

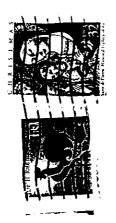
- An appropriate building has been identified where the material can be accommodated,
- Storage of such material is aligned with the site mission more correctly at considered locations other than ETTP in Oak Ridge,
- At Portsmouth the material will stay within the same regulatory framework as at present, and
- Since the EA was issued, I read that that Tennessee (TDEC) has been promised that stores of depleted uranium hexafluoride will be removed from the state within ten years. If so, there would be little sense in shipping a supply of a different fluoride to Tennessee in the near future!

Sincerely,

Clout Peella

Robert Peelle







Ma David R. Allen
ORO NEPA Compliance Officer
ORO NEPA Compliance Officer
Dept. of Energy Oak Ridge Operations Office
PO Box 2001
Oak Ridge, TN 37831-2001

Landadada Handada Hamalla and Handada

John, These are Kristi and my comments on the Fernald EA on behalf of ourselves and RACE. Could you forward these to David Allen or send me his email address so I can submit them today? thanks a lot. If you have any questions, let me know. Mark D. David Allen
U.S Dept. of Energy
Oak Ridge Region
March 4, 1999

Dear DOE,

These are the comments of the undersigned on the draft EA for the movement of uranium materials from Fernald.

1. The purpose of an EA is to determine the potential significance of a proposed action. Certain factors are required by the CEQ in their NEPA regs to be considered by the agency in making this determination. These factors are found at 40 CFR 1508.27. This is, in fact, a site-specific project, and therefore, requires a site-specific context in applying these factors in the significance determination. It is our opinion that a compliant application of these factors would not result in a finding of no significant impact. Factor # 7 is the requirement that the agency look at cumulative effects during the significance determination. Some courts (for example, the 5th circuit) have ruled that during the threshold determination of significance, the duty to look at cumulative effects is even more detailed that during the EIS process, for if a FONSI is issued, this will be the only look at cumulative effects of the proposal.

Response: Cumulative impacts were examined and documented in section 4.8. DOE used the definition of cumulative effects defined in the CEQ Regulations. The effects of the proposed action when combined with past, present, and reasonably foreseeable future actions do not result in significant adverse impacts.

2. On its face, this EA is deficient. The EA inappropriately segments the actions into transportation, storage, and final disposition for purposes of NEPA analysis. This is a clear violation of NEPA. In a convoluted "Addendum", the agency tries to fast talk its way out of its duties to consider the combined effects of the storage, transportation, and long-term disposal, but this fails miserably. This is a site specific proposal, and a 1994 EA done for another part of the project, which, while it should have included the entire process, could not have because the proposal to move the material had not been made, cannot be adequate to meet the public information and scrutiny aspects of NEPA. This is not fully informing the public.

Response: As shown in the Addendum, DOE fully considered transportation of the uranium materials in several documents beginning in 1994. NEPA and CERCLA were followed and public review and comment were solicited on these actions. Further, the outbound shipments

from ORO will move in DOE-approved packaging, subject to DOE radiation, contamination or fissile controls and other DOE Federal or State requirements.

3. In addition, there are cumulative effects from other ongoing projects at Paducah. These are clearly documented in the site management plan, which has not undergone NEPA review. While the management at Paducah keeps repeating as it mantra that the CERCLA analysis meets all the requirements of NEPA, the transportation addendum flatly contradicts this, stating, (finally) that "...DOE excludes Removal actions from requiring detailed NEPA documentation..." There is no doubt that there needs to be a cumulative effects analysis done of ALL the action ongoing at the site, and segmenting each individual project into a discreet analysis unit is not in compliance with NEPA. If such an analysis were undertaken, there would be no doubt that the impact would be potentially significant and require an EIS. This would and should be the site-wide EIS we have been calling for years. At a bare minimum, this should require a supplement to the EIS process ongoing for the depleted uranium, but DOE isn't even doing this. This EIS process is fatally flawed unto itself for being segmented into a discreet unit, while there are considerable and significant other actions ongoing at the site with cumulative impacts.

Response: Comment noted; see responses to comments 1 and 2 above.

4. Two other factors which are potentially significant relevant to this process are the effects on public health and safety, and the scientific uncertainly surrounding the proposal. Clearly, if there is emissions and escape of radio nuclides or uranium element into the environment which gets distributed into the food chain or into an environmental media which could cause any kind of ecological or human exposure, there is clearly a public health and safety concern which is significant. While DOE, as typical, attempts to brush these concerns off with a broad brush of statements of no impact, these conclusory statements are supported on the record with nothing. They do not comply with NEPA, which requires that findings such as this be supported with valid, objective data, which can be obtained by the public, and which is clearly identified in the record. Conclusory statements of no impact impress us not, and are in violation of NEPA. What are the emission rates of the various materials, and what are the exposure routes. What are the ecological effects, and what is the time span these effects could continue. These questions are not adequately answered or supported in the EA.

Response: As indicated in the DEA, emissions under normal operating conditions are effectively zero. The outside of the containers in which this material is packaged can be safely handled and workers require no special protection when working near the containers. Under accident situations, the doses (facility worker, co-located worker, and the public) are computed and the risk of exposure determined (see Table B.8).

5. The biggest scientific uncertainly associated with the Paducah site is the seismic hazard. It is common knowledge that the site is within a high risk seismic zone. Just recently, there has been renewed media stories about the Central Midwest Consortium's annual meeting and their call for earthquake preparedness in our region. Yet, DOE brushes this off inexplicably. This is clearly potentially significant, and needs a hard look site-wide.

Response: The radiological risk associated with these uranium materials was determined for several scenarios including seismic risk (Table B.8).

- 6. In addition, just the fact that DOE is calling this a temporary move because they don't know what to do with the materials long term is clear evidence that there is strong scientific uncertainly associated with these materials.

 Response: The uranium materials are being moved from FEMP in order to comply with a regulatory commitment made to the state of Ohio. DOE expects to sell these materials as commercial product.
- 7. Another factor is the effects on federally listed species. While the EA lists the evening bat as federally listed, we don't believe that is correct. However, the Indiana Bat is clearly critically endangered. The conclusion that it does not occur on the plant site is not supported by the record. A clear look at the record on Indiana Bats shows that their foraging range could easily put them into the range of impact. They could easily consume insects which have become contaminated with emissions from this material. If this affects their reproductive capacity, which some evidence suggests, then this could be construed as "harm", which would be a take. It is the opinion of the commentors that an incidental take permit is necessary at this point to continue any cleanup or production activities at the plant, and failure to have completed formal Section 7 consultation to implement conservation guidelines to minimize the take is a violation of the Endangered Species Act, which would be potentially significant also under the CEQ guidelines.

Response: DOE is consulting with the U. S. Fish and Wildlife Service and state fish and game departments regarding any potential adverse impact to protected species.

8. Another potential regulatory requirement which is not mentioned in the EA is the possible requirement for a point source runoff permit for the storage area and the immediate adjacent lands. Where will this area drain, and what kind of contamination can we expect in these runoffs? Finally, wouldn't this require a RCRA permit? How would the lands being proposed for storage be regulated? What capacities would be allowed? What storage requirements would be set? How would the public be involved in this process?

Response: DOE will comply with all regulatory requirements.

These are all questions which need to be answered.

Thank you for considering these comments, and please keep us on the mailing

list to receive future mailings regarding this proposal.

Mark Donham Kristi Hanson RACE/Heartwood RR # 1, Box 308 Brookport, IL 62910 618-564-3367(H) 502-443-3082(W)

Southwest District Office

401 E	East Fifth Street	
Dayk	on, OH 46402-2911	

TELE: (837) 286-8367 FAX: (937) 288-8249

George V. Volnavich, Governor Nancy P. Hallister, L.L. Governor Pomplet R. Schwegerdus, Directo

March 3, 1999

STEVEN WYOTT	FRANCE MARKET		
ca Dot - OKO	Co. DM D 6/18		
Dopl.	Phone #		
Par 423-576-1665	*** **********************************		

Mr. David Allen
NEPA Compliance Officer
U.S. Department of Energy
Oak Ridge Operations Office
SE-32
P. O. Box 2001
Oak Ridge, TN 37831-2001

Dear Mr. Allen:

Listed below are Ohio EPA's comments on the Uranium Receipt and Storage EA:

General Comments

- Ohio BPA concurs with the EA conclusion that the DOE Fernald site does need to remove 3800 metric tons of uranium from the sits in order to complete cleanup activities at Fernald.
- 2. If the ultimate location for this material is to be at the DOE Oak Ridge facility in Tempesce, we would recommend that the material be sent there directly from Fernald to Oak Ridge. This will reduce overall shipping costs and reduce transportation risks by handling this material only once.
- 3. If any of this material is shipped to the Portsmouth Gascous Diffusion Plant for interim or long term storage, funding should be provided to the Portsmouth site to cover the costs of managing this material. The Portsmouth cleanup budgets have been out significantly in the past several years and this storage effort should not further impact the Portsmouth cleanup program.

Specific Comments

Page 3.1.8 Infrastructure

Fernald discharges treated effluent to the Great Mismi River not the Little Mismi River.

OFFICIAL FILE COPY
AMESQ

Log No.	C 0278		
Date Received_	MAR 0 4 1999		

(Rev. 3/96)

File Code		Printed on the	polasi Paç

Mr. David Allen March 3, 1999 Page 2

Please contact me if you have any questions about these comments.

Sincerely,

Graham E. Mitchell

Chief, Office of Federal Facilities Oversight

cc: Tom Schneider, OEPA

Donna Goodman, OEPA

Melody Stewart, OEPA

Diana Caball

Jack Craig, DOE Fernald

Molda Raferty, DOE Portsmouth



March 2, 1999

Mr. David Allen
NEPA Compliance Officer
Oak Ridge Operations, SE-32
U. S. Department of Energy
P.O. Box 2001
Oak Ridge, TN 37831

OFTIONAL FORM 99 (Y-90)			
FAX TRANSMITT	AL	# of pages >-	12
"Wayne Tolbert	المسام	الققال	art
Dept Agency SAIC	57	16-89	<u>53_</u>
1481-8797	Fax #		
MSM 7540-01-317-7388 S088-101	GENERAL	SERVICES ADM	INISTRATION

Subject: Comments on the Draft Environmental Assessment (EA) for the U.S.

Department of Energy, Oak Ridge Operations, Receipt and Storage of Uranium

Materials from the Fernald Environmental Management Project Site (DOE/ORO-2078)

Dear Mr. Alien:

The Oak Ridge Reservation (ORR) Local Oversight Committee, Inc. (LOC) submits the following comments on the subject draft EA. The LOC Board of Directors voted unanimously to comment that the LOC would have no objection to storage of uranium materials at Y-12 that are consistent with its mission. However, the LOC objects to storage of additional uranium materials at K-25, also known as East Tennessee Technology Park (ETTP), considering that the uranium hexafluoride (UF6) cylinders currently stored there are a disincentive to reindustrialization and a potential hazard to workers.

The LOC is a non-profit regional organization funded by the State of Tennessee and established to provide local government and citizen input into the environmental management and operation of the DOE ORR. The Board of Directors of the LOC is composed of the County Executives of Anderson, Knox, Loudon, Meigs, Morgan, Rhea, and Roane Counties; the Mayor of the City of Oak Ridge; and the Chairs of the Roane County Environmental Review Board, the City of Oak Ridge Environmental Quality Review Board, and the LOC Citizens' Advisory Panel (CAP). The CAP has up to 20 volunteer members with diverse backgrounds who represent the greater ORR region.

No preferred alternative is given in the EA. The CAP proposes that storage of the uranium materials at the Portsmouth Gaseous Diffusion Plant be the preferred alternative, for the following reasons:

The Portsmouth facility offers the most options and even has an empty building (X-3002) suitable for storing the uranium material. The proposed action is consistent with the current mission at Portsmouth. Storing the uranium material at Portsmouth also avoids transfer of materials across state lines.

Anderson • Meigs • Rhea • Roane • City of Oak Ridge • Knox • Loudon • Morgan

- 2. Receipt and storage of these materials is not consistent with the current ETTP mission. The Oak Ridge public and the Tennessee state regulators are increasingly unwilling to accept the continued storage of the depleted UF6 at ETTP, as there is no defined use for the material in the foreseeable future and the cylinders require ongoing surveillance and maintenance to ensure that they are not breached. DOE should not propose storage of additional depleted uranium when the existing stockpile is destined for removal and/or conversion to a stable oxide form.
- 3. Most of the uranium is depleted (2761 metric tons); locating it at Y-12 in its doubly secure area is not in keeping with the current Y-12 mission. However, locating the 799 metric tons of low-enriched uranium (LEU) at Y-12 until its sale is finalized appears commensurate with the plant's mission.
- 4. The Paducah site is limited in space and has increased earthquake and wind hazards. The action is otherwise consistent with its mission, although it is a less advantageous location than Portsmouth for these reasons and due to the transportation distance.

If you have any questions regarding these comments, please call me at 483-1333. Sincerely,

Susan L. Gawarecki, Ph.D., P.G.

w Maule

Executive Director

cc: LOC Citizens' Advisory Panel

LOC Board of Directors

Bill Pardue, Chair, ORREMSSAB

Earl Leming, Director, TDEC DOE-O

Steve Richardson, Acting Manager DOE ORO

Carol Borgstrom, Director, Office of NEPA Policy & Assistance, DOE-HQ Charles E. Bradley, Jr., Office of Nuclear Energy, Science and Technology

February 22, 1999

David Allen NEPA Compliance Officer Oak Ridge Operations SE-32 P.O. Box 2001 Oak Ridge Tn. 37831

Dear Mr. Allen,

I wish to submit my comments on the Fernald EA. There are several reasons for not moving the uranium metal to Paducah. The first is Paducah is a small site and has more than our fair share of waste, such as 40,000 cylinders of our own and several tons of scrap metals. Paducah does not have a facility to store this metal and would have to build one. The second reason is that the Paducah plant is near the New Madrid earthquake zone. Geologists predict a severe quake to strike the region in the next few years. For this reason the Paducah Plant should move our waste out of the region. I feel certain that the Department of Energy would disagree since a lot of our waste lies in 14 ton cylinders, but these cylinders have small 2 inch fill valves with very little protection. I feel there will be numerous breaches of these fill valves during an earthquake. I believe we should be reducing the waste at Paducah instead of bringing more to this area for storage. I have included information of the fault from the earthquake consortium and a list of seismic data activity.

Thank You.

Ronald Lamb

10990 Ogden Landing Rd.

Rosald hand

Kevil, Ky. 42053

OFFICIAL	FILE	COPY
	HSQ	

Date Received MAR 0 4 1999
File Code

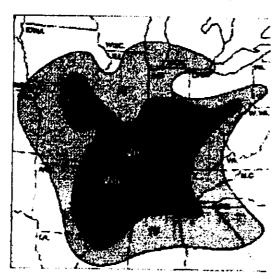
Central United States Earthquake Consortium



The Great New Madrid Earthquake

In the winter of 1811-1812, the central Mississippi Valley was struck by three of the most powerful earthquakes in U. S. history. Even today, this region has more earthquakes than any other part of the United States east of the Rocky Mountains. Government agencies, universities and private organizations are working to increase awareness of the earthquake threat and to reduce loss of life and property in future shocks.

The 400 terrified residents in the town of New Madrid (Missouri) were abruptly awakened by violent shaking and a tremendous roar. It was December 16, 1811, and a powerful earthquake had just struck. This was the first of three magnitude-8 earthquakes and thousands of aftershocks to rock the region that winter.



Survivors reported that the earthquakes caused cracks to open in the earth's surface, the ground to roll in visible waves, and large areas of land to sink or rise. The crew of the New Orleans (the first steamboat on the Mississippi, which was on her maiden voyage) reported mooring to an island only to awake in the morning and find that the island had disappeared below the waters of the Mississippi River. Damage was reported as far away as Charleston, South Carolina, and Washington, D.C.

These dramatic accounts clearly show that destructive earthquakes do not happen only in the western United States. In the past 20 years, scientists have learned that strong earthquakes

http://www.cusec.org/madzone.html

in the central Mississippi Valley are not freak events but have occurred repeatedly in the geologic past. The area of major earthquake activity also has frequent minor shocks and is known as the New Madrid seismic zone.

Earthquakes in the central or eastern United States effect much larger areas than earthquakes of similar magnitude in the western United States For example, the San Francisco, California, earthquake of 1906 (magnitude 7.8) was felt 350 miles away in the middle of Nevada, whereas the New Madrid earthquake of December 1811 (magnitude 8.0) rang church bells in Boston, Massachusetts, 1,000 miles away. Differences in geology east and west of the Rocky Mountains cause this strong contrast.

The loss of life and destruction in recent earthquakes of only moderate magnitude (for example, 33 lives and \$20 billion in the 1994 magnitude-6.7 Northridge. California, earthquake and 5,500 lives and-\$100 billion in the 1995 magnitude-6.9 Kobe, Japan, earthquake) dramatically emphasize the need for residents of the Mississippi Valley to prepare further for an earthquake of such magnitude. Earthquakes of moderate magnitude occur much more frequently than powerful earthquakes of magnitude 8 to 9; the probability of a moderate earthquake occurring in the New Madrid seismic zone in the near future is high. Scientists estimate that the probability of a magnitude 6 to 7 earthquake occurring in this seismic zone within the next 50 years is higher than 90%. Such an earthquake could hit the Mississippi Valley at any time.

In 1811, the central Mississippi Valley was sparsely populated. Today, the region is home to millions of people, including those in the cities of St. Louis, Missouri, and Memphis. Tennessee. Adding to the danger, most structures in the region were not built to withstand earthquake shaking, as they have been in California and Japan. Moreover; earthquake preparations also have lagged far behind

Recognizing these problems, the U.S. Geological Survey (USGS) and other organizations are joining in actions that will greatly reduce loss of life and property in future temblors:

- In 1983, the states of Arkansas, Illinois, Indiana, Kentucky, Mississippi, Missouri, and Tennessee formed the Central United States Earthquake Consortium (CUSEC). CUSEC improves public earth-quake awareness and education; coordinates multi-state planning for earthquake preparedness, response, and recovery; and encourages research in earthquake hazard reduction.
- In 1990, the USGS, advised by private, academic, and government experts, issued a plan for intensified study of the New Madrid seismic zone. At the same time, the National Earthquake Hazards Reduction Program expanded efforts in the central United States.
- Earthquake education is now part of the curriculum in the schools of many CUSEC states. In Kentucky, the state legislature has mandated that earthquake education be taught in schools.

 Earthquake Awareness Weeks have been held in Arkansas and Kentucky for several years, and in Tennessee starting in 1995.

AL OF

- Volunteer earthquake advisory councils or similar organizations have been formed in most CUSEC states.
- In 1993, with USGS support and collaboration, the CUSEC state geologists began a significant effort to map earthquake hazards. In 1995 they completed a regional soils map that can be used to locate areas likely to experience intense shaking in earthquakes.
- Most CUSEC states have adopted building codes containing modem earth-quake design standards
- Efforts to ensure the seismic safety of critical structures, such as dams, bridges, and highways, have accelerated.
 For example, in 1990, transportation agencies in Illinois, Kemucky, and Tennessee initiated programs to strengthen highway bridges that do not meet earthquake design standards.

Strong earthquakes in the New Madrid seismic zone are certain to occur in the future. In contrast to the western United States the causes and effects of earthquakes in the central and eastern United States are just beginning to be understood. Through better understanding of earthquake hazards and through public education, earth scientists and engineers are helping to protect the citizens of all parts the United States from loss of life and property in future earthquakes.

For more information Contact:
The U.S. Geological Survey 901-678-2007
Center for Earthquake Research and Information
The University of Memphis. Memphis, Tennessee 38152

For more details Visit:
The Virtual Times, New Madrid Earthquake section.

U.S. Geological Survey Fact Sheet-188-95, 1995



TOTAL TRANSPORTED TO THE PARTY OF THE PARTY

New Madrid Fault Poses Potential Risk to Midwestern States

Posted on Fri. 24 Apr 1998 17:16:21 GMT

Written by Jennifer Brill, DisasterRelief.org Writer

Six million people living in midwestern states could be at risk if an earthquake occurred along the New Madrid fault line which runs diagonally from Marked Tree, Arkansas to southeastern Missouri.



That's why the Central U.S. Earthquake Consortium headquartered its operation in Memphis, the southernmost largest city on the fault.

An earthquake in this midwest region would cause more damage than one on the west coast, says Elaine Clyburn, a response planner with Red Cross Disaster Services. Clyburn is assigned to the consortium to help educate the community on earthquake preparedness.

In addition to the fault line, the region's geology poses additional challenges.

Because the soil in the central U.S. is looser and sandier than on the west coast, Clyburn says, "the shockwaves from an earthquake would travel much farther and the same magnitude earthquake on the west coast would be about 10 times worse in the central U.S."

Experts say that an earthquake could occur anywhere along the fault line running from Memphis to its northern point in St. Louis.

Seven states especially at risk from the New Madrid fault line belong to the consortium: Arkansas, Illinois, Indiana, Kentucky, Missouri. Tennessee and Mississippi.

"In the central U.S., a major earthquake would affect the entire country," Clyburn says. "A lot of commerce depends on railroads and 18-wheelers. It would be like having a hole in the middle of the country."

The worst quake to hit this region occurred in 1811 when the earth moved enough to cause the Mississippi River to temporarily reverse its usual course of north to south. Whole lakes were created, such as the Reelfoot Lake in Kentucky.

In 1811 the population was a fraction of its current size. Today, many more people would be affected by a quake similar to that of 1811, which registered around 9.0 on the Richter scale. Clyburn says that would be "so scary that it's hard to talk about preparing for it."

The possibility of such a quake should offer residents a strong incentive to learn how to ready themselves for an earthquake during April's Earthquake Preparedness Month.

Clyburn says that enhanced preparation is especially necessary in the Memphis-St. Louis area where adhering to building codes is an issue.

"Humanity has not paid much attention to where we put our buildings. We like the idea of building where we want to build," which may not be such a good idea when a fault line is involved.

Each of the seven states at risk from the New Madrid fault line promotes awareness, supported by the consortium. Building awareness takes on several forms, Clyburn says, such as sponsoring poster contests for children and posting displays at the public library.

"There's no way to predict when one could happen," Clyburn says, though she adds, "There's an excellent chance that we'll lave a major earthquake in the next 15 years."

The area has two earthquakes a week but they're generally not felt. Instruments placed underground, called "seismic networks," are sensitive enough to differentiate between a train and a tremor in the earth.

"It's easy to behave as if there is no threat, or to be unaware of it," Clybum says. "That's why we try to educate people."

Since earthquakes can't be predicted, they're generally talked about in terms of probabilities and historical evidence.

"A fault is buried under the earth, so it's not like looking at the sky and seeing a dark cloud," Clyburn explains.

Related Stories

Preparing for Earthquakes is a Leason in Strength -- December 2, 1997

Related Links

Are you Ready for an Earthquake? English or Español

Central United States Earthquake Consortium

Los Angoles Red Cross Chapter

NOME SEARCH FEEDBACK SITEMELP COPYRIGHT

The following catalog is for earthquakes in the New Madrid seismic zone, and is produced by the Cooperative New Madrid Seismograph Network (CNMSN), a member of the Council of the National Seismic System. CNMSN support comes from the United States Geological Survey and the State of Tennessee.

In the early 1800's, the New Madrid seismic zone was the site of what are considered to be the largest earthquakes to have occurred in the conterminous United States. During the winter of 1811-1812, a series of three earthquakes, estimated at magnitude 8 or larger, struck in a period of three months. There have been several magnitude 6-7 events since that time and there is a continuing activity of small marthquakes that defines the present day seismic zone. The principal seismic activity is found in western Tennessee, northquast Arkansas, and southeast Missouri.

Other catalogs for various regions of the United States can be obtained using the finger mechanism 'finger quake@machine'. The following list gives the machine names for different regions.

```
gldfs.cr.usgs.gov
                      (USGS NEIC/NEIS world-wide)
andreas.wr.usgs.gov
                      (Northern California)
scec.gps.caltech.edu (Southern California)
fm.gi.alaska.edu
                      (Alaska)
seismo.unr.edu
                      (Nevada)
mbmgsun.mtech.edu
                      (Montana)
eqinfo.seis.utah.edu (Utah)
sisyphus.idbsu.edu
                      (Idaho)
quake.eas.slu.edu
                      (Central United States)
tako.wr.usqs.qov
                      (Hawail)
```

Additional catalogs and information are available on the World Wide Web at the URL 'http://www.geophys.washington.edu/seismobig.html'.

The Date/Time is given in Universal Time Coordinates (UTC), which is 6 hours ahead of Central Standard Time (5 hours ahead of CDT).

Magnitudes are reported as Md (local duration magnitude) unless otherwise noted.

Q denotes the location quality: A = good, D = poor.

Updated on August 3 1998.

Date-(utc)-time	LAT LON	DEP MAG (2	COMMENTS
yy/mm/dd hh:mm:ss	deg. deg.	km		
98/01/09 09:05:59		7.0 2.2	В	New Madrid, Missouri (C)
98/01/17 19:40:07	36.59N 89.62W	6.5 2.2	В	New Madrid, Missouri (C)
98/01/27 09:58.40		12.0 2.5	A	Dyersburg, Tennessee (C)
98/01/28 22:05:12	36.10N 89.76W	11.4 2.7Lg	В	
98/02/12 09:37:49	36.14N 89.71W	9.6 3.0	λ	Caruthersville, Missouri: felt in Hayti and
98/02/13 23:08:12	36.10N 89.76W	€.5 1.9	à	
93/02/19 14:05:27	36.54N \$9.58W	8.9 2.7	A	
98/02/19 22:22:49	36.48N 89.56W	8.2 1.9	A	New Madrid, Missouri (C)
96/02/26 02:10:25	36.49N 89.56W	5.2 2.5	B	New Madrid, Missouri (C)
98/03/11 00:09:43	36.63N 89.32W	5.0 1.5	C	13.63 km northwest of Hickman, Kentucky (p)
98/03/13 03:05:27	36.26N 09.61W	7.4 2.0	B	10.69 km north of Caruthersville, Missouri
98/03/15 06:56:46	36.43N 89.52W	5.3 2.5	В	6.63 km northwest of Tiptonville TENNESSEE
90/03/21 06:52:23	36.15N 89.47W	15.8 1.6	В	12.51 km south of Ridgely TN (C)
98/04/08 18:16:49		13.9 3.2Lg	В	15.77 km east of Cairo IL (N)
98/04/09 05:13:41		6.8 2.7Lg	В	3.48 km norwest of Tiptonville, TN, Felt n
98/04/27 10:22:43	36.24N 89.48W	6.6 2.0	Α	2.61 km south of Ridgely TN (L)
98/04/29 01:44:56			В	
98/05/11 00:07:15	36.88N 89.07W	4.3 2.6Lg		
98/05/12 09:37:10		7.0 1.7	A	
98/05/21 06:37:19		2.6 1.5	C	8.01 km west of New Madrid, Missouri (L)
98/05/21 14:53:29	36.20N 69.43W	6.0 1.7	A	8.24 km southeast of Ridgely, TN (L)
98/05/27 06:04:52	36.11N 89.01W	4.5 2.4	D	
98/06/11 07:44:12	36.17N 89.45W	9.6 1.8	λ	10.35 km south of Ridgely Tennessee (L)
98/06/27 05:19:16	37.08N 69.8GW	6.0 2.1	A	3.14 km east of Steele, MO (L)
98/07/05 07:48:10		9.3 1.4	В	7.6 km northwest of Ridgely Tennessee (C)
98/07/15 04:24:51		13.2 3.1Lg	В	7.5 km north of New Madrid, MO (L,N)
98/07/22 22:11:57	37.65N 90.20W	17.5 2.7	С	WOMACK, MO mblg = 2.65 (SLU)

http://clwe.ceri.memphis.edu/~seisadm/cgi-bin/eq_ceri.cgi

98/08/01 02:21:10 35.64N 90.40W 4.1 2.0 A 11.8 km north of Marked Tree, AR. (C) 98/08/16 04:23:03 A 5.1 km southeast of Ridgely, TN (L) A 21.8 km west of Osceola, AR. (M) 36.23N 69.45W 6.5 1.9 98/09/05 00:35:02 35.77N 90.20W 9.9 2.2 98/09/06 18:35:30 A 15.7 km north of Newbern, TN. (L) A 5.89 km west of New Madrid, MO (N) 36.26N 89.29W 6.2 2.3 36.60N 98/09/14 23:24:19 89.59W 16.2 1.8 98/09/17 08:46:41 36.85N B 14.02 km east of Sikeston MO (N) 89.45W 1.7 2.1 98/10/05 22:50:45 36.44N 7.5 1.8 89.54W A 8.91 km northwest of Tuptonville TN 98/10/15 09:47:22 35.62N 90.45W 12.1 2.9Lg A 10.0 km north of Marked Tree, AR (C) 98/10/26 00:29:52 37.00N D GARWOOD, MO (SLU) 90.88W 5.0 2.6 98/10/26 09:46:57 35.80N 90.03W 2.0 2.0 D 12.77 km north of Osceola AR (L) 98/11/03 15:47:53 36.43N 89.52W 8.4 2.2 Α 7.24 km northwest of Tiptonville TN (L) 98/11/09 18:36:47 36.50N 89.53W 5.9 2.2 9.06 km south of New Madrid MO (N) 8.98 km south of Blytheville AR (C) A 98/12/16 10:45:34 35.86N 8.6 2.4Lg B 89.95W 99/01/06 09:26:23 88.33W 35.66N 10.9 2.4 B 25.75 km east of Jackson, TN (C) 99/02/03 16:59:20 35.32N 90.84W D 45.39 km southwest of Marked Tree AR (L) 3.9 2.3

PADUCAH GASEOUS DIFFUSION PLANT SITE SPECIFIC ADVISORY BOARD

Chartered under the Federal Advisory Committee Act

CO-CHAIRS

Mark Donham Route 1, Box 308 Brookport, Illinois 62910 mdonham@igc.org

Vicki Jones 1131 Hamburg Road Kevil, Kentucky 42053 ionesvw@ornl.gov

BOARD MEMBERS

Noise Courtney 14299 Wickliffe Road Kevil, Kentucky 42053 ncountney@bhsl.com

Edward Duff 5134 Old 45 Paducah, KY, 42003

Angela Farmer 29 East, Lakewood Drive Metropolis, Illinois 62960

David Fuller 670 Springwell Lane Paducah, Kentucky 42001

Judy Ingram 1711 George Clark Road, South Benton, Kentucky 42025 joingram @ apex.net

Honaid Lamb 10990 Ogden Landing Road Kevil, Kentucky 42053 chce@ldd.net

Linda Long 10625 Ogden Landing Road Kevil, Kentucky 42053

Ray McLennan 2931 Mayfield Fload Paducah, Kentucky 42001 molennan@pad-uky.campus.mcl.net

Craig Rhodes 3883 Mt. Pleasant Rd. Brookport, Illinois, 52910 crhodes @midwest.net

Jim Smart 223 North Ninth Street Paducah, Kentucky 42001 jemart@engr.uky.edu

Bill Tanner 6072 Rosebud Road Metropolis, Illinois 62960

Rev. Gregory Waldrop 4141 Buckner Lane Paducah, Kentucky 42001 waldrop4@sunsix.infl.net

MEMORANDUM

DATE: March 4 1999

> David Allen, Oak Ridge Operations TO:

NEPA Compliance Officer

FROM: Paducah Site Specific Advisory Board

SUBJECT: Comments on the Fernald Environmental

Assessment

At a regular meeting of the Site Specific Advisory Board (SSAB) held February 18, 1999, the board identified comments on the draft Environmental Assessment for the U.S. Department of Energy, Oak Ridge Operations Receipt and Storage or Uranium Materials from the Fernald Environmental Management Project Site.

General Comments:

The Paducah SSAB recommends that Fernald pursue amendments to the appropriate regulatory documents allowing the uranium materials to be retained at the Fernald site pending resolution of the long-term disposition strategy. Nothwithstanding this recommendation, if the DOE decides to move the uranium materials, the Paducah SSAB recommends that the uranium materials should be moved the least distance possible to reduce the environmental impact of transportation

OFFICI/	AL FILE COPY
Log No.	C OKOS
Date Received	MAR 0 5 1999
File Code	



Specific Comments:

- 1. Page 2-7: Drawing is out of date even though it says rev. 1/20/99. There are buildings and pads in the general area designated for the storage area.
- 2. Page 2-11, Paragraph 1: What is the benefit of using a combination of sites?
- 3. Page 2-11, Paragraph 2: The first sentence appears to be poor planning, not a justification for not considering commercial facilities.
- 4. Page 2-11, Paragraph 4: "to support compliance with regulatory requirement" seems to use this as an excuse for poor planning and as a hammer to make something happen.
- 5. Page 3-6, Paragraph 4: Change "PGDP" to "DOE reservation."
- 6. Page 3-6, Paragraph 5: Where did these numbers come from? Is this 1992 data?
- 7. Page 3-6, Paragraph 6: Using 1992 data seems outdated.
- 8. Page 3-6, Paragraph 7: Why not look at 1998 or even 1997 radionuclides sources rather than 1992? If you bother checking, we believe you will find the vapor degreasers in C-400 are no longer operating. Didn't anyone visit the site or talk to the people at the Paducah Site?
- 9. Page 3-7, Paragraph 2: Check on numbers of plumes believe there are 3 now (major or minor?).
- 10. Page 3-7, Paragraph 5: List source of the identification of the federally listed species. A 1994 Corp Study did not list the evening bat in this area and identified the pearly mussel as endangered. Also, none of these species were identified on the DOE Reservation. I think a list of the Kentucky E&T species should be included.
- 11. Page 3-8, Paragraph 4: Sewage is treated "onsite" not "offsite."
- 12. Page 3-8, Paragraph 5: The Corp has performed a cultural resources survey. I believe it was completed in 1994.
- 13. Page 4-5, Paragraph 4: What about waste from the construction/site preparation. I believe soil in that area is PCB contaminated. There are buildings and pads that are not depicted on your map, will their existence change preferred location?
- 14. Page 4-9, Paragraph 3: I believe USEC might disagree that cleanup is the major priority at the site. I would like the source of the baseline identified and a list of "future changes."
- 15. Page 5-1: Why wasn't up-to-date information about Paducah used?
- 16. Page 6-1: Appears "walk-downs" were performed at Portsmouth and Fernald, why not Paducah and Oak Ridge?
- 17. Page B-9, Paragraph 6: What goes in the blank?

The information used was significantly out of date, and in some cases, totally incorrect. The general impression of this project is that Fernald has a regulatory driver and it will be met. How long has this project been going on? It appears this part of the project is being rushed.

Yggdrasil Institute

PO Box 131, Georgetown, KY 40324, USA 502-868-9074 (phone and fax)

March 3, 1999

Mr. David Allen NEPA Compliance Officer DOE Oak Ridge Operations, SE-32 PO Box 2001 Oak Ridge, TN 37831

RE: Environmental Assessment for the US Department of Energy, Oak Ridge Operations, Receipt and Storage of Uranium Material from the Fernald Environmental Manatement Project Site (DO/ORO 2078)

Dear Mr. Allen:

I believe that the 3800 metric tons of depleted uranium now at Fernald should stay where they are until they are sold, rather than be moved to any of the alternative sites. Surely the agreement between the Department of Energy and the State of Ohio can be amended to make this commonsense step possible. If the material is valuable, can it not be sold within a short time period?

The storage at the alternative sites may not itself involve risks, but there is always risk in transportation. The tonnage involved would mean a major shipping initiative. Furthermore, transportation would mean a waste of resources: the consumption of fossil fuels and the consequent increase air pollution.

Sincerely.

Many B. Davis

Mary Byrd Davis

	L FILE COPY MESQ
Log No	C OKS3
Date Received_	MAR 0 5 1999
File Code	

) C

The rest was some of the second of the contract of the contrac

OPTIONAL FORM 99 (7-90)

FAX TRANSMITT	AL # of pages > /3
"Dayne tolbert	From Melisa Hart
SAIC	Phone 6710-8983
*** 481-8797	Fign #
NSN 7540-01 317_7388 \$698, 101	GENERAL CERVICES ACADMICTOATION

David Allen NEPA Compliance Officer DOE Dakridge Operations SE-32 P.O. Box 2001 Oak Ridge, Tennessee 37831

Facsimile: (423) 576-0411

Re: Public Comment on Draft Environmental Assessment for Proposed Receipt and Storage of Uranium Materials From the Fernald Environmental Management Project Site.

Dear Mr. Alleh

Please include this correspondence and attachments as part of the agency's official record of proceedings on the above-referenced proposed agency action.

The following comments to the agency will contain considerable objection and criticism of the agency's public participation process, implementation of NEPA, and offer challenge to the finding of fact. Finding of No Significant Impact, proposed in draft Environmental Assessment.

Therefore, in fairness to the U.S. Department of Energy as the lead agency, I would like to begin by thanking the Department of Energy Cakridge Operations, NEPA Office for extending the public comment period originally scheduled to begin on February 1, 1999 and end on February 10, 1999 until Harch 4, 1999. Although. I definitely feet that 30 day comment period fails to provide sufficient time for public review and comment by all parties who have interest in the proposed action, extension of the public comment period does provide opportunity for limited review and participation by a few members of the public other than those representing the interests of the Pernald Environmental Management Project Site

DOE proposes to transfer some 3,800 metric tons of uranium metal in various forms to candidate sites (Portsmouth Gameous Diffusion Plant, Piketon, Ohio, Paducah Geseous Diffusion Plant, Paducah, Ky., and Y 12 Plant and Bast Tennessee Technology Park, Cakridge Tn.) for interim storage until the material can be sold at market value "rather than disposing the material as waste," Ref .: DOE/ORO-2078, 1.1 Purpose and Heed for the Proposed Action.

Agency statement of "Purpose and Need" pre-determines decision/disposition by the agency to potentially offer for sale 800 Metric Tons of LEO and/or 3,000 metric tons of uranium metal in other forms from the Fernald Site. DGE proposed action has significant, i.e., programmatic impact: 1) DOE has short-circuited the process of declaring any of this material to be "Excess Property," and 2) failed to implement criteria/guidance policy in disposing of property that is declared to be "Excess Property" by such determination as stated in EA. Ref .: GAD/RCED-99-3. By implication in EA statement of purpose and need:

This effort (material transfers and sales) is part of the U.S. Department of Energy's (DOE's) decision to change the mission of the PEMP site; it is currently shut down and the site is being resediated. This remaining nuclear material inventory must be removed from the site by the end of fiscal year (FY) 1999 (July 1, 1999) to support commitments made to the state of Chio. Interest in the material has been by the U.S. Department of Defense and other connectial ventures.

According to PEMP Record of Decision (ROD), Operable Unit 3. August 1996. PEMP Site History:

Production operations began in 1952 and continued until July 1989, at which time operations were placed on standby to focus on environmental compliance and waste management initiatives. Pollowing appropriate congressional authorizations, the facility was formally closed in June 1991. TO REFLECT A NEW MISSION POCUSED ON ENVIRONMENTAL RESTORATION. (emphasis added) the name of the facility was changed to the FEMP in August 1991.

By considerable emission and implication in statement of purpose and need for the proposed action. DOE has flown under the radar screen of accountability to the public by agency failure to address the proposed action as a programmatic decision with considerable consequences to the public. By deciphering statement of purpose and need, DOE must be referring 1991 DOE change in mission of FEMP or DOE decision yet-to-be-made-public of FEMP's new mission. In either circumstance, DOE has failed to address the proposed action as significant in EA. *Commitments made to the state of Ohio* to remediate the FEMP site should not be co-mingled and confused with commitments to share the revenue with the state of Ohio from the sale of "Excess Property" managed by DOE for all taxpayers nationally.

Procedure for the sale of 800 metric tons of LEU by the Ohio Field Office requires full disclosure in final draft of SA. Apparently, considerable lack of accountability to the public has been allowed to occur in the procedure to sell property which DOE has yet to declare as "Excess" though any recognizable process. What is the value of this 'property' in which the U.S. Department of Defense and other commercial ventures have expressed "Interest." It would certainly seem apparent that the Ohio Pield Office and site management contractor have implemented disposition of public property as "excess" with little review or accountability to the public in the process. Has the Office of Defense Programs declared the 600 metric tons of LEU "excess" to missions' nameds? When was this done and by what mechanism? When was the 3,000 metric tons of uranium metal in various forms declared "Excess Property" and by what DOE office? Is decontamination some or all of the 3,000 metric tons required before DOB releases the property for "reuse" or sale? What is the market value/sale value of this material and what agencies/entitles share the revenue from the male to "commercial" ventures?

After the property has been determined to be excess, the regulations state that the property must first be screened for reuse or transfer to others before offering it for male to the public. Personal property is first screened for reuse within DOE, then for

transfers to the Math and Science Education Gift Program (under Executive Order 12821) and to the Community Reuse/Economic Development Program (under P.L. 103-160). Subsequent steps include making property available to educational institutions such as colleges and universities under the Used Energy Related Laboratory Equipment Grant Program (P.L. 101-510) and to other federal agencies and state donation programs. Personal property that remains after the screening process can be sold to the public or discarded. Ref.: GAO/RCED-99-3, page 5.

It would seem disingenuous, at the very least, to "share" the revenue generated by the sale of 800 metric tons of LBU to commercial buyers/vendors with ventures under the process described as anticipated agency procedure for disposal of excess personal property (not real property, lands, etc.). It would seem as disingenuous for colleges and universities to solicit radioactive materials including the residuals and residues owned by DOE currently on site at FEMP for medical and research purposes. Interested parties in the Pernald Uranium transfer should not be parties interested in getting a share from the proceeds of sale of these materials. DOE mission statement does not include sale of hazardous and toxic materials to the highest bidder for distribution among parties c)alming an interest/ share of the profits.

Obviously, DOE has pre-determined to offer nuclear materials and by-products of uranium processing for transfer and/or sale rather than dispose of those materials as "waste" which is hazardous and toxic to humans and the natural environment. When did any such decision-making provide program-wide public participation and opportunities for comment? Again, the action proposed in draft EA falls to address connected actions with significant program-wide impacts in DOE disposition of materials.

DOE cannot reasonably assert that materials with hazardous and toxic characteristics can be safely isolated from the human and natural environment simply by calling them "nuclear materials" with economic value rather than waste. Materials, whether classified as waste, by-product, assets, feed materials, metals, or nuclear inventory, pose the same risks to human health and the natural environment which should reasonably cause DOE to require the same standards of protection to prevent contamination. DOB actions should not seek to circumvent intent of CERCLA, SRA, and TSCA.

Draft EA defines the economic impact of the proposed action much too narrowly. A structure to temporarily store the 3,800 metric tons of nuclear materials at other DOE sites until sale or transfer does not address the total, foreserable economic impacts of DOE action (as stated in EA purpose and intent). Five million dollars and three new worker jobs to monitor the materials in the interim fails to include: 1) packaging costs for transport from FEMP. 21 transportation costs to one or more of DOE's candidate receiving sites. 3) transportation from the candidate/host site(s), 4) revenue from the sale of materials, 5) cost to construct the other facilities required by "disposition" of these nuclear materials to private, commercial ventures, and 6) remediation/clean up and nuclear waste disposal costs from -3the operations of commercial reuse or recycling/reprocess facilities which DOE can reasonably foresee and predict to result from the proposed action.

DOE is mandated to comply with Executive Order 12866, and all others. A significant regulatory action is defined as a rule which may result in:

1) \$100 million or more adverse effect upon the economy, a sector of the economy, productivity, competition, jobs, the environment, public health, safety of state, local, or Tribal governments;

2) create a serious inconsistency or interfere with an action planned or taken by another agency;

3) materially after the budgetary impact of entitlement, grants, user fees, loan programs or the rights and obligations of loan recipients; and

4) raise novel legal or policy issues arising out of legal mandates.

he set forth in Executive Order 12866. DOE proposed action is significant and subject to review by the Office of Management and Sudget (OMB) and requirements of E.O.12866. Note that "cost" savings must be included in determination of \$100 Million dollars economic impact. DOE has failed to consider the direct and indirect increaseable impacts of the proposed action, including the considerable long and short term costs, risks to the public and worker majety, and environmental consequences in draft EA. The finding of no significant impact proposed by the agency is not supported by the data. DOE has failed to include the costs of transportation in proposed action.

Recent transportation contract awarded to International Technologies Inc. (IT) for transport of materials/waste from the FEMP totalled \$122,000, see Attachment I. Obviously, agency experience would result in DOE conclusion that transport of 3,800 metric tons of uranium from the production and processing facilities at the former uranium processing facility would result in considerable dollar amount cost which should reasonably be added to the \$5,000,000, cost estimated by DOE for construction of Tension-Support Structure(s) (TSSs) at proposed interim storage sites. Pailure to address the physical processes required for transport/transfer of the nuclear materials from PEMP to receiving sites represents considerable unission.

Hote that EA presents dose calculations based upon incomplete/missing data. "Breathing rate of 3.3 E-4 m 3/s based on ______." Lack of supporting data in calculation of public and worker risk from inhalation of uranium does inspire confidence in finding of no significant impact.

"Commitments" made to the state of Ohlo referenced in purpose and need for the proposed action require explanation in EA. What "commitments" have already been made and precisely what is required to fulfill those commitments has been omitted from draft proposal. Transportation is an obvious requirement/result of the proposed action, as in the impacts associated with the transfer. Communities along the transportation routes are not even mentioned in passing (by rail or truck) in DOZ EA. DOE has added Transportation Addendum to draft EA which addresses the obvious transportation requirement inherent in the proposed action. However, no discussion of modets) (rail, truck, air carrier) is included. Cost of feasible means of transport with DOE consideration of radiation dose exposures to the general public, workers, and freight employees is included. Bluntly stated, DOE is focused upon the impacts to the FEMP remediation ONLY, and has excluded worker exposure, risks to communities along the

transportation routes resulting from incident/accident radiation dose release in EA. DOE is required by CEQ regulations to avoid improper segmentation (by elimination) of original draft. Addendum fails to address transportation as an impact of the proposed action. Rather, DOE has listed (with no explanation) regulations that apply during transport of the nuclear materials. No discussion of cost, safety, or risk to the public is provided. DOE is required to address "worst case scenerio" as a potential adverse impact from incident/accident during transport which has not been done in EA or Addendum of 1/12/99. Final paragraph in Addendum concludes:

The outbound shipments from ORO will move in DOE approved packaging, subject to DOZ radiation, contamination or fissile controls and other DOE and federal requirements.

Conclusion of the Transportation Addendum provides no meaningful information whatsoever about what is being moved, where the material is being moved from (ORU may be a missprint since all other transportation discussion is focused upon removal of nuclear materials from the FEMP site as part of remediation activities of the site), what standards of protection and regulations apply and how DOE proposes to comply, whether the materials proposed to be moved require decontamination before transport from the site(s), what 'fissile controls' are required, what "other DOE and federal requirements" apply and how the agency proposes to comply with these undisclosed requirements! The unission is considerable and fails to inspire trust and confidence that the total plan with considerable potential adverse impacts is being addressed in EA and its FONSI conclusion. DOE has falled to follow its own agency policy and guidance documents, as well as other federal regulations which direct the agency to avoid all actions likely to lead to loss of public trust and confidence. Transportation Addendum reference to "fissile controls" logically leads to conclusion that DOE has falled to address considerable "worst case scenerio" impacts, and all others, likely to result from the proposed action.

...when transportation is in any respect a major factor... the environmental impacts of such transport should be analyzed, even when DOB is not responsible for the transportation. Transportation impacts include those from transport to a site, on-site, and from a site, when such activities are reasonably construed as part of the proposed action or analyzed alternative. If not otherwise analyzed, include any necessary loading or unloading activities in the transportation impact analysis.

Ref.: RECOMMENDATIONS FOR THE PREPARATION OF ENVIRONMENTAL ASSESSMENTS AND ENVIRONMENTAL IMPACT STATEMENTS, U.S. DEPARTMENT OF ENERGY OFFICE OF MEPA OVERSIGHT, May 1993.

Citing own guidance document (previously referenced) Recommendations for analysis of TRANSPORTATION IMPACTS are directed to:

 Analyze of all links that are reasonably foreseeable parts of the proposed action (which has been omitted entirely from PA and Addendum) 11.30

- 2) Avoid (do not) rely exclusively on general statements that transportation will be conducted in accordance with applicable regulations and requirements of U.S. DOT, U.S. EPA, NRC, state authorities, DOE (which is precisely how EA has added Addendum "addressing" transportation to draft EA)
- 3) Evaluate both routine (incident free) transport and accidents. Give special amphasis to public or worker health impacts from exposure to radiation or chemicals (which is completely emitted from PA and Addendum)
- 4) Be sure to use defensible estimation methods for assessing the radiological impacts of transportation (such as the most current version of RADTRAN) independent of estimation radiological impacts have been included, the opussion is indefensible due to "finally" materials referenced in conclusion of Addengum)
- S) Estimate the annual and total impact of all DOE and non-DOE transportation associated with the use of specific routes (if known) over the term of the proposed action. . .including the impact on a maximally exposed individual. The impacts related to transportation must be totalled over the duration of the project (e.g. 48 trips per year for 5 years). (No modes of transport or routes have been addressed, radiation dose to a maximally exposed individual has not been considered, duration of the project and number of train or truck loads required has been omitted from EA and Addendum)
- 6) In determining the cumulative impact from transportation activities, use available data to estimate, for example, the number of radioactive materials packages that were shipped over a given transport routing system over a given period of time (no cumulative impacts from rail route and truck route transportation has been included in PA shippents among the DOE sites discussed in PA and Addendum although cumulative impacts from 40 years should be considered significant in cumulative impact).

DOE is being disingenuous in multiple failures to address transportation in a manner compilant with agency policy and guidelines. DOE cannot avoid addressing transportation due to implementation of transportation requirement in DOE proposed action by an outside/independent contractor. DOE and other agencies should not attempt to avoid disclosure of the total plan by hiding "the plan" behind Fernald/FEMP clean up which is precisely what has been attempted in deatt EA.

Furthermore, Addendum which addresses transportation only by stating transportation is required for FEMF remediation with conclusion referencing "outbound" shipments of "fissile" materials (indirectly by implication that fissile controls are required) provided only two of three documents referenced in Addendum. Document 81: Letter (no date) Kim Hayes (no agency affiliation or title) to Thomas Rowland (no affiliation or title), April 12, 1993; subject: Sate Shutdown Environmental Assessment cannot be located by DOE ORO or DOE Pernald! BUE has used this letter (document) in Addendum as justification for the proposed action and finding of no significant impact and is unable to produce/provide a copy of the letter. I requested a copy of this letter (FOIA) in order to include it in research for public comment period on EA and was informed by the DRO and Fernald Public Information Centers that the letter could not be located. From the lack of information provided in reference to what DOE has indicated is a crucial document in this

you<u>yulbu ral luuda ral med bio b</u>ees

proposed action, this missing letter could, in fact, have absolutely nothing to do with PERP remediation and/or the subject of EA proposed action. DOE should reasonably be able to locate and provide a letter of crucial importance in issuing a FONSI on its proposed action, but has falled to do so.

Draft EA fails to address radiological and chemical dose exposures to workers and the general public required by transport of these nuclear materials and during "interim" storage at the receiving mite(s). Note that DOE has indicated a willingness to use a "hybrid alternative," i.e., shipments to more than one site for "mtorage" prior to ultimate/final disposition. EA implies decision to ship to more than one site is being considered, though discussion of that alternative is not addressed. 1.2 SCOPE OF THIS ENVIRONMENTAL ASSESSMENT. 1-1 defines scope of the proposed action as:

The Ohio Field Office will assume responsibility for environmental analyses and documentation for packaging and transport of the materia) as part of the remediation of the site (FRMP), and DRO is preparing this EA for receipt and storage at one or more sites.

Scope of EA is narrowly focused upon movement of nuclear materials from the FEMP site as part of that site's remediation while falling to address and disciose what disposition is proposed for these materials after they are shipped from FRHP to some other DOE site(s). DOE actions and intentions require full explanation in final EA. Unnecessary segmentation of actions result in findings which are inappropriate. DOE states intention in Transportation Addendum to move the materials (from ORO?), but fails to include where the materials are to be uitimately transported and for what purposes. It would appear that "recycling" metals, metal fabrication, and other potential uses would be anticipated to cause other major polluting facilities to be constructed or converted and should be addressed in EA. DOE cannot appropriately avoid disclosure/public participation by storing, then handing off such materials to private, commercial facilities licensed by NRC rather than DOE based upon a finding of no significant impact.

"Commitments made to the state of Ohio" require full explanation. Both DOE and the state of Ohio have failed to disclose the commitments which cause the actions proposed in EA to occur, and would provide information as to the total scope and purpose of the proposed action(s). Both U.S. EPA and NRC have regulatory statutues which require DOE compilance at FEMP. DOE appears to be proposing compliance with U.S. EPA mandates at the FEMP site as an isolated action which does not require the same level of compliance with other federal and state regulations once the material leaves the Fernald Site. The finding (FONSI) and public participation process described as "public involvement" addresses the proposed action(s) from the perspective of the FEMP site ONLY. DOE is mandated to fully address the adverse impacts and consequences caused by proposed actions to "stakeholders" likely to be adversely affected as this process is implemented in final version of BA.

Public (and media) interest exist by potentially adversely effected parties. but 'participation' can occur only when DOE provides information necessary for informed participation as the process is necurring, i.e., when decisions are being made by the agency. See Attachment II.

3

DOE is required to notify interested and adversely affected parties by legal notification process. How and when was this done? I can find no public notification of draft EA's availability for public comment in the federal register, or in legal notice in subscription newspapers available within the Brown County. Ohio area which properly notified the public of any proposed agency transport of nuclear (fissile) materials through local communities. DOE press release was available on internet, but does not provide legal notice to the directly effected public. Editorial and newspaper reports do not provide proper. It is public notification of opportunity for participation and comment. As stated previously, extension of the public comment period from original 10 day time period is helpful, but does not meet MEPA requirements of involving the public early in the process. DOE is well-aware that participation from the PERP/Fernald public only fails to include adversely effected parties from comment/objection/decision-making process.

DOB is requested to prepare program-wide EA/EIS which address the major federal actions being proposed for implementation in draft EA. DOE's disposition of "excess" inventory property has considerable potential impacts and should be decided in a public forum rather than tagged-on to PEMP remediation. Program-wide decision-making implications contained in EA include: 1) depiete uranium management (dispose as waste/use as restricted construction material, feed materials in nuclear fuel production), 2) recycling/recovery of uranium and uranium milling residues, including Thorium and Radium, 3) recycling of uranium metals in various forms, and 4) recycling or disposal of stari/metals when Decontamination and Decommissioning (DED) of DOE production facilities occurs. June 1994 ROD and August 1996 ROD requires DLD of FEED production facilities (Operable Unit 3). DOE and its contractors cannot implement D&D at FEMP in the absence of program-wide decisions without setting precident at other DOE facilities nationally. Bluntly stated, FEMP stakeholders are certainly not the only stakeholders/effected parties by DOE decision-making regardless of commitments made to the state of Ohio! DOE cannot proceed to set precident without providing access to decision-making process based on a narrowly focused FONSI. See previous comment on compliance required by DOS with Executive Order 12866.

DUE is also required to comply with Executive Order 12898, February 16, 1994 which mandates federal agencies to avoid actions resulting in disproportionate adverse environmental and health impacts in low-income and minority communities. DOE facilities named as potential candidate sites in EA are all located in economically depressed regions. August 1996 ROD provides for complete demolition and removal of process buildings, including contaminated concrete from the FDMP site. Movement of 3,800 metric tons of uranium materials is specifically required in order to accompileh demolition of the FEMP production buildings and processing facilities. DOE is required to include disposition of the considerable waste stream from that process in a public participation and Implementation process involving more than FEMP site input. DOE is apparently using FEMP as the "pilot project" in Site restoration. The agency is required to address implications from such decision-making in context of its potential to set precedent in DOE policy and future actions at other sites. (Executive Order 12866.) DOE is required to consider ultimate disposal/disposition of materials to be generated by FBMP site remediation and DOB's ultimate goal for the federally owned lands when FESP remediation projects are completed at the site.

Given the arbitrary nature of the process used by DOE to date in declaring "excess property" in inventory, statement of DOE intent is required in final PA. DOE has considerable reason to predict that implementation of FRMP environmental management and restoration will likely result in the FRMP site (land) becoming excess real property. What are the agency's intentions after remediation is completed at FRMP? As remediation progresses, wastes are to be characterized and disposed, according to DOE decisions with U.S. EPA regulations of hazardous and toxic materials, and under NRC regulations of radioactive materials.

Current proposals for FEMP future uses include giving the FEMP site back to the Indians. Does DOE intend to use FEMP as a "pilot program" for giving other DOE/federally owned sites/land back to the Native Americans, including the Naniord site in Washington state? Biuntly stated, DOE's site contractor at FEMP also manages Nanford. In 1996 U.S. District Court Decision, Backcounty Against Dumps v. EPA, the court ruled that U.S. EPA did not have authority under RCRA to approve (or disapprove) tribal solid waste permit programs. Disposition of excess federal lands from DOE back to "the Indians" would seem to remove U.S. EPA from the permitting process required at FEMP and at other sites declared by DOE to be excess real property, as well. DOE is required to consider the proposed action in EA in context of the total remediation currently being implemented at PEMP and in context of programmatic implications.

Does DOE envision disposition of federal lands presently under DOE management becoming excess real property in DOE inventory which could be given back to the Indians? Any such potential decision-making process must be addressed by the agency in program-wide decision making process with tuil participation by effected and interested parties. Removal of U.S. EPA from authority under RCRA would certainly appear to create "unique" regulatory issues, or more accurately, a void thereof.

Draft EA attempts to focus upon the immediate need and requirement to transfer 3,800 metric tons of uranium from FEMP. The agency has failed to include data necessary to justify its proposed finding of no significant impact. Final draft should comply with DOE policy and guidance in implementation of MEPA and address the total impacts of the proposed agency action. The agency is requested to respond to my questions and the issues of concern raised in this correspondence. Program-wide policy decisions should be determined by program wide decision-making documents. The agency has authority to require accountability from its contractors, including Flor Daniel at PEMP. Ref .: Price-Anderson Act. Legal and other maneuvering to exclude/remove U.S. EPA from authority at FEMP or any other DOE site should not be tolerated, and most certainly not condoned by the agency. The legacy from the nation's nuclear weapons program is considerable. Some 5,000 of the DOE's 20,000 facilities were declared "surplus" in 1996. Characterization of these 5,000 facilities has not yet been completed, but 'a large number" are known to be contaminated with hazardous, toxic, and/or radioactive substances. Both the Hanford, Washington and FORP site are known to be contaminated. Hantord (250) and Fernald (180) have the most facilities in the decomplesioning process at this time and the same contractor. Procedure proposed to be implemented in the "disposition" of excess property at FBMP is disingenuous and self-serving by the parties involved at the long term expense to the public in dollars, public health and safety, and natural environment. DOE is respectfully requested to prepare a final draft of EA which includes the required data for credible finding, including policy to be

set, for the proposed agency action.

In conclusion, to avoid any misinterpretation that I am suggesting an other tederal, state, local agency, or planning commission could or would be preferred to manage the considerable legacy created by former nuclear weapons production within the past 50 years, DOE can and should use the policies and procedures presently in place within the agency and its considerable resources in all agency actions, particularly the action proposed in draft EA. Final EA should address errors and omissions. DOE does provide volumes of information to the public which is not available from any other agency. The information available from DOE allows me to offer these comments on the proposed action. DOE is capable of applying considerably higher standards of agency review and oversight and is herein requested to do.

Respectfully submitted,

Diana I. Cahall 7019 Ashridge Arnheim Road Sardinia. Ohio 45171 (937) 446-2763

Attachments

VIA THE U.S. POSTAL SERVICE, CERTIFIED MAIL, RETURN RECEIPT REQUESTED, ARTICLE NUMBER ______, ON MARCH _____, 1999.

cc:

By The U.S. Postal Service, regular mail, postage prepaid, on 3/4/99 to:

Ohio Field Office/Ohio EPA

- U.S. Department of Energy, Pernald Office
- U.S. Department of Energy, Washington, D.C.
- U.S. EPA, Region 5

Steven L Wyatt. Director U.S. Department of Energy Oak Ridge Operations
Public Affairs Office
Fax: (423) 576-1665

February 12, 1999

<u>.......</u> -- --

Dear Director Wyatt:

Thank you for your prompt response to my request for a copy of the "Transportation Addendum" to the Environmental Assessment/
Receipt and Storage of Uranium Materials from the Pernald Environmental Management Project Site.

My initial reading of the Transportation Addendum indicates that DOE has previously addressed Transportation as an issue included in environmental process by reference back to past DOE documents. In isolation, the Addendum doesn't provide the information I require for informed comment. Could you please provide me with a copy of each of the following documents referenced by DOE Field Office as having previously adequately addressed Transportation?

- 1) No title provided, document(s) referenced in INTRODUCTION. ENVIRONMENTAL ASSESSMENT FOR THE U.S. DEPARTMENT OF EMERGY. DAKRIDGE OPERATIONS. RECEIPT AND STORAGE OF URANIUM MATERIALS FROM THE FERNALD ENVIRONMENTAL MANAGEMENT PROJECT SITE. DOE/ORO-2078, page 1-1, paragraph 1 in statement as follows: "This remaining material inventory must be removed from the site by the end of fiscal year (July 1, 1999 translation added) FY 1999 to support commitments made to the State of Ohio." Documents required which specify in detail the commitments made by DOE to the State of Ohio.
- 2) Document referenced in Addendum as:
 REMOVAL ACTIONS #12. SAFE shutdown of the former
 production facilities at the FEMP, paragraph 2, which
 continues "DOE determined that the implementation of the
 SAFE SHUTDOWN REMOVAL ACTION (Including material disposition)
 was excluded from regulring a detailed NEPA evaluation
 (e.g. an Environmental Assessment)."
- 3) Letter: Kim Hayes to Thomas Rowland, April 12, 1993: subject: Safe Shutdown Environmental Assessment.
- 4) June 1994: Operable Unit 3 RECORD OF DECISION for interim Remedial Action: Fernald Environmental Management Project. (FEMP) Fernald. Ohio.
- 5) August 1996: Operable Unit 3 RECORD OF DECISION for Final Remedial Action. FEMP. Fernald. Ohio.

Please provide the information requested herein within 10 working days so that I will have opportunity to include the information contained therein as part

of timely public comment to the agency on the proposed action in the Σ - λ -referenced previously in this correspondence.

Thank you for your timely assistance.

Viona Catal

Diana Cahall

7019 Ashridge Arnheim Road

Sardinla. Ohlo 45171

(937) 446-2763, telephone and facsimile

- ;; -

Transmitted at approx. 2:50 P.M.

mr. Wystl:
Paper Copy for
your receios

for comewhat

uneadable

at times.

læton, Ohio 45661 A 740 - 289 - 3654 F: 740 - 289 - 4591

roindustrializing south contral ahio

March 4, 1999

Dave Allen USDOE Oak Ridge Operations PO Box 2001 Oak Ridge, TN 37831

Dear Mr. Allen,

re: USDOE Fernald material relocation.

OPTIONAL FORM 98 (7-90) FAX TRANSMITTAL

The Southern Ohio Diversification Initiative (SODI) wishes to make comments regarding the destination of material from the USDOE Fernald Site, especially related to the USDOE Portsmouth

The SODI is working cooperatively with the local communities and the Department of Energy to develop and implement programs that will lessen the impacts resulting from the reductions of employment at the local site. A central theme, and the key to our long term transition success, is the reuse of buildings, lands, and equipment located on the Portsmouth Reservation.

We believe that relocating the material from Fernald to the Portsmouth Site negatively impacts our reindustrialization efforts. Public perception will play a vital role in our marketing program and reuse success, both of which are targeting a variety of companies to diversify our regional economy.

We recognize the Department of Energy has obligations with the regulatory agency(s) concerning removal of the Fernald material. With that in mind, we make the following recommendations:

- Any material transferred to the Portsmouth Site should not be stored in facilities with a viable potential for reuse and alternate job creation. Specifically, any facility targeted for storage should be reviewed and approved by the SODI-DOE's designated Community Reuse Organization This will ensure the negative impacts to our Reindustrialization Strategy will be
- 2. Buildings X-3002, 3001, 3346, 3000, 1000 (and other facilities) are initial priorities for our Reindustrialization Strategy and should not be considered for Fernald material storage.
- 3. If Portsmouth is to receive a portion of the Fernald material, new facilities should be constructed

If you have questions or comments concerning any of the above feel free to contact me.

Sincerely.

Gregory L. Simonton

SODI Executive Director

OFFICIAL FILE COPY

____c 0292

Date Received __MAR 0 8 1999

File Code



STATE OF TENNESSEE

DON SUNDQUIST GOVERNOR

March 11, 1999

Mr. David R. Allen, ORO NEPA Compliance Officer U.S. Department of Energy PO Box 2001, SE-32 Oak Ridge Operations Office Oak Ridge, TN 37831-8739

Dear Mr. Allen:

As the Governor's Lead Contact for State of Tennessee National Environmental Policy Act (NEPA) reviews, I am providing comments in response to the Draft Environmental Assessment for the Oak Ridge Operations Receipt and Storage of Uranium Material from the Fernald Environmental Management Project Site DOE/ORO-0278. The attached comments from state agencies represent the complete and official response of the State of Tennessee. These comments are limited to the scope of study appropriate for the aforementioned document. Please give these comments your full consideration.

The State of Tennessee firmly and unequivocally supports the defense and national security mission and role of the Oak Ridge Reservation. The Draft EA does not, however, clearly demonstrate that the proposed Monitored Retrievable Storage Facility at Oak Ridge would further present of future defense and national security needs. It has not provided sufficient information for the State to consider the overall impacts resulting from the transfer of materials to Oak Ridge and does not show a contingency plan for future disposal.

The State has not supported the use of the Reservation for storage of off-site materials that have no identified use. Past studies have established that Oak Ridge is a poor location for long-term storage of wastes:

The State specifically appreciates the early communications and interaction with DOE on this issue and would like to see this process continued. We believe successful resolution is much more likely when the State is involved early in the process.

State Capitol, Nashville, Tonnessee 37243-0001 Telephone No. (615) 741-2001 Mr. Allen Page 2 February 8, 1998

We appreciate the opportunity to comment. If you have any questions, please contact Earl Leming or Dale Rector at (423) 481-0995, our staff policy analyst at 615/532-4968, or me.

Sincerely,

Justin P. Wilson

Deputy Governor for Policy

JPW/emw

cc: Mr. Milton H. Hamilton, Jr., Commissioner
NEPA coordination file/Mr. Dodd Galbreath
State NEPA Contacts



STATE OF TENNESSEE DEPARTMENT OF ENVIRONMENT AND CONSERVATION DOE OVERSIGHT DIVISION 751 EMORY VALLEY ROAD OAK REGGE, TENNESSEE 37800-7872

March 5, 1999

David R. Allen, ORO NEPA Compliance Officer PO Box 2001, SE-32 DOE Oak Ridge Operations Oak Ridge, Tennossee 37831-8739

Dear Mr. Allen

Document NEPA Review: Draft Environmental Assessment for the U.S. Department of Energy, Oak Ridge Operations Receipt and Storage of Uranium Material from the Fernald Environmental Management Project Site, DOE/ORO-2078, February 1, 1999

The Termessee Department of Environment and Conservation, DOB Oversight Division (TDEC/DOE-O) has reviewed the subject document in accordance with the requirements of the National Environmental Policy Act (NEPA) and associative regulations of 40 CR 1500-1508 and 10 CFR 1021 as implemented.

The State of Tennessee strongly supports the Defense and National Security missions on the Oak Ridge Reservation. The State has not supported use of the Oak Ridge Reservation for storage of off-site materials that have no identified future use or may be declared a waste at some future date.

The Draft EA appears to propose a Monitored Retrievable Storage Facility (MRS) at a site other than Fernald. The Draft EA has not demonstrated that such a facility meets present or future Defense Programs needs for the material or other national security interest, nor has it provided sufficient information to allow the State to consider the overall positive and negative impacts resulting from a transfer of the materials to Oak Ridge.

The Division appreciates the early interaction with the DOE on this issue. We believe cooperation and issue resolution is more likely when the State is involved early in the NEPA process. We would like to see this process continued.

David R. Allen March 5, 1999 Page Two

Enclosed for your review and response are general and specific comments. If you have questions, please contact Dale Rector or me at (423) 481-0995.

Sincerely

Enl C. 3

Earl C. Leming Director

xc Steve Richardson - DOE

Dale Jackson - DOE

Justin Wilson - Governor's Policy Office

Dodd Galbreath - TDEC, Environmental Policy Office

el454.99

Tennessee Department of Environment and Conservation/DOE-Oversight Comments on the Draft Environmental Assessment DOE/ORO-2078, February 1, 1999

The U.S. Department of Energy, Oak Ridge Operations Receipt and Storage of Uranium Material from the Fernald Environmental Management Project Site

General Comments:

In order to reasonably assess whether the Fernald material is an asset material required for Defense needs or other national security considerations the EA should provide information on existing complex wide inventories of similar material and how much has been transferred over the past five years to the Department of Defense or "other interests."

The EA does not describe a contingency plan for the storage and eventual disposition of this material in case no markets are developed. Although the EA states on page 1-1 there is an "interest," the material is "potentially marketable," and it is in the best interest of DOE to "eventually market or use" the material, DOE may require long-term management of the material. The draft EA risk analysis indicates that a container breach would occur primarily from long-term corrosion. Without proper storage and maintenance the material from Fernald could experience corrosion. The DOE should avoid this situation with the Fernald material by planning for adequate funding for storage and maintenance. The EA should address associated cost for transportation, long term storage, and disposition (including disposal). It should also address any plans for cost recovery through sales or other forms of revenue exchange. The EA should clearly identify the DOE program, which would be responsible for the material and that programs funding assurance or needs to properly store, maintain, and disposition the material. It should also address future decontamination and decommissioning cost of equipment and facilities.

The draft EA is inconsistent in many areas of consideration. A description of existing contamination, fire suppression systems, and ventilation was provided for some candidate site buildings, while the buildings at Y-12 and ETTP did not receive the same consideration. Some proposed areas were evaluated as flood zones while areas at Y-12 and ETTP did not have the same evaluation. Other sites were evaluated for upgrades to facilities while there were no assessments done for the buildings at Y-12 and ETTP. In order to evaluate this document for issuance of an EIS or FONSI, complete and consistent information must be provided.

It has been indicated that material exists in the inventory that requires a Nuclear Category 2 storage facility. The category should be described and the site(s) under consideration evaluated to determine if they meet the same nuclear category or what will be required to upgrade the facilities to a Category 2. The amount of material requiring Nuclear Category 2 storage must also be identified.

The radioactive contamination levels of candidate buildings must be described. The presentation made to this Division clearly indicated that the material from Fernald would be in clean packages, i.e.: free from external contamination, and would be placed in "pristine" facilities.

The transportation evaluations for moving the material was absent from the draft EA and provided only after request. If the containers are transported off site, they must be evaluated for transport suitability, as the document states there have been problems with long-term corrosion.

The EA must address the inspection and maintenance programs that have allowed the long-term corresion to occur. The final BA should include all incidents of container breaches and releases of material. The final EA should also describe the storage containers including type and thickness of metal.

Requested funding in FY 2000 to upgrade the existing facilities at Y-12 for storage of highly enriched uranium has been cut. Additional material stored in substandard facilities increases the risk of release to the environment and exposure to the public. It does not appear the risk analysis used substandard facilities in the evaluation.

At the request of Tennessee, DOE has imposed a limit for storage of LEU at 6 MTU for the Y-12 site. No inventory above that limit is allowed as specified in the Finding of No Significant Impact (FONSI) for the Environmental Assessment (EA) of the "Proposed Interim Storage of Enriched Uranium Above Maximum Historical Storage Level at Y-12 Plant, Oak Ridge, Tennessee."

Specific Comments:

Page 1-1. Section 1.1 PURPOSE AND NEED FOR THE PROPOSED ACTION

"Of the remaining inventory there are approximately 3800 metric tons of potentially marketable material..." This remaining 3000 metric tons of uranium material that is not potentially marketable should be considered waste.

Page 2-1. Section 2.1 BACKGROUND

"... an area where at least two tension-support structures..."

The EA should clearly indicate that these are temporary tent-like structures and not permanent buildings.

Page 2-8. 2.5 Y-12 Plant
The Nuclear Category level and contamination levels (if levels exist) of the buildings should be described.

Page 2-8, 2.6.1 K-1066F Area
The draft EA should specifically state whether the K-1066F area is or is not within a flood zone.

Page 2-8, 2.6.2 K-131 and K-631 Buildings
The "Remedial Investigation Report for the East Tennessee Technology Park, Oak Ridge, Tennessee, Volume 5" does not list K-131 as having a basement. Additionally, both buildings are listed as having contamination areas, failing a acreen for the report, and requiring further evaluation in the having contamination areas, failing a acreen for the report, and requiring further evaluation in the feasibility study. These buildings are currently listed on a decontamination and decommissioning list. During the presentation made to the Division, it was stated by DOE that the storage of this material was to be "pristine" facilities. Storage in contaminated buildings would not meet that goal.

"These buildings are approximately 200 ft south of Poplar Creek at its closest point." Explain the significance of this statement in terms of flooding.

Provide information for the meaning of "nominal" in the statement "The nominal basement size is 22,765 ft."

Page 2-1, 12.8.1 Commercial Facilities

The requirement to have all the uranium removed from the FEMP site by September 30, 1999, should be cited. Although the draft EA states there "was not enough time to prepare and issue a competitive request for proposal..." the DOE has known for some time this material needed to be removed from the FEMP site.

Page 3-3 and 3-11. Table 3.1 and Table 3.4

A comparison of Table 3.1 and 3.4 indicates that Cincinnati was included for the Fernald site analysis, but Knoxville was not included in the Oak Ridge site analysis. Knoxville is as close to Oak Ridge as Cincinnati is to Fernald; therefore, Knoxville should have been included in the analysis of the Oak Ridge sites.

Page 3-9, Section 3,4.2 Climate and Air Quality

"For radiological pollutants, emissions are variable and amanate mostly from the TSCA incinerator."

TSCA is not the primary source of radiological emissions. In the 1997 ASHR, less than one Curie of radiation was reported as being emitted from the TSCA stack. Over 10,000 Curies were reported as being emitted from the HFIR stack. Only .013 Curies of uranium were released from Y-12 during 1997; however, Y-12 was still in "stand-down" mode. The most effected individual for the ORR was closest to the HFIR stack not the TSCA stack. Please revise this section to reflect the above statistics.

Page 3-9, Section 3.4.1 Public and Worker Risk

Y-12 should have the same considerations as the Portsmouth and Paducah sites for "radiation dose from airborne radionuclides..." and "collective radiological dose from airborne amissions..." The document is inconsistent in its evaluations.

Page 3-9, 3.4.3 Water Resources

Floodplains are not addressed nor is groundwater. This section is inconsistent in evaluation with other sites' sections.

Page 3-10, 3.4.5 Ecological Resources

Lake Reality is not considered waters of the State and is a man-made, spill containment pond that has heavy mercury and PCB contamination. Its location is now adjacent to Upper East Fork Poplar Creek.

Page 3-11. Section 3.5 EAST TENNESSEE TECHNOLOGY PARK (formerly K-25 Site). This section discusses the East Tennessee Technology Park (ETTP) as a possible site. The ETTP is being reindustrialized. The use of the site as a storage area for Uranium material does not appear to meet the current mission for the ETTP. The EA should address the D&D Trust Fund which is the main source of funding for ETTP operations and how ETTP funds would be used to store and disposition the Fernald material.

Page 3-11. Table 3.4

Please explain what the "Fernald Region of Influence" (in table title) means and how it impacts Anderson and Roane counties. The "Fernald Region of Influence" is also mentioned in Tables 3.2 and 3.3.

Page 3-11, 3.5.1 Public and Worker Risk
ETTP should have the same considerations as the Portsmouth and Paducah sites for "radiation dose from airborne radionuclides..." and "collective radiological dose from airborne emissions..." Again, the document is inconsistent in its evaluations.

Perc 3-12, 3.5.3 Water Resources. Surface Water
"...most of ETTP is above maximum flood level" does not adequately describe the potential for
flooding at proposed storage sites. Flood levels are measured in terms of "X" year floods, that is, a
25-year flood will reach a certain elevation above sea level in a certain location, while a 100-year
flood will reach a higher elevation in the same location. The proposed locations for this material are
located near Poplar Creek. The paragraph should provide specific information whether or not a flood
could inundate the area and the flood plain year (25, 100, etc.).

Page 3-12, 3.5.3 Water Resources. Groundwater
"...conduit-dominated flow has been confirmed only in portions underlain by Knox carbonate along
Black Oak Ridge." One-third of all bedrock wells at ETTP intersects cavities, which are generally
water-filled. At least one of the proposed locations had adjacent dolines shown on topographic and
geologic maps of the area. Conduit flow should be sud is the base assumption for unconfined
carbonate aquifers such as those that underlie the ETTP proposed storage sites. The fact that conduit
flow has only been delineated in one area at ETTP should not be used to imply that conduit flow does
not exist in other carbonate units beneath the site.

Page 4-1, 4.1 Public and Worker Risk, first paragraph
Provide information for the statement, "In addition, the initial assessment to determine...."
specifically outlining what is meant by "a review of the fate of the uranium in the off-site environment...." Also provide information as to where this assessment appears in the appendices.

Page 4-2, 4.1 Public and Worker Risk first and second paragraph
"Uranium that is released from primary and secondary containment...." It appears that the modeling did not use the tension support structures proposed for storage of this material.

Page 4-3: 4,6.1 Normal Operations, fifth paragraph
"...workers could be exposed to direct radiation from surface contamination."
Storage containers should not have any surface contamination. The DOE's original presentation to this Division stressed the packages would be clean and kept in a clean environment. Although these packages may be stored on brown field areas, they are not scheduled to be in any type of secondary containment building. Containers should be free of contamination to prevent release of surface contamination to areas outside the designated storage.

Page A-3. Appendix A

To prevent moving the material twice or more, the 193 MTU of normal uranium scheduled to be
used for blend stock should be moved directly to the sites using the material. Furthermore, if other
users for the inventory are identified, the material should be transported directly from Fernald to the
user to avoid transporting twice.

The total pounds and MTU amounts do not match the totals given on page A-4 and Table B.1.

Page A-5, Appendix A

The chart is describing "depleted" uranium but the total is stated for "all normal."

Page B-4, Appendix B. Table B.1

The inventory amounts for the total normal uranium MTU do not match the amount listed in Appendix A, page A-3. The total low-enriched uranium pound amount does not match the amount listed in Appendix A, page A-7.

Page B-6, Table B.4

The tornado windspeed for Oak Ridge is less than Fernald and Paducah. How was the wind speed determined, and why was it less for Oak Ridge?

Page B-6, Appendix B, page B-5, Table B.2, and Container Breach

It is listed that an accident involving a container breach due to corrosion or degradation of the storage containers could occur. The condition and age of the storage containers should be fully examined and included in the final EA. The material also needs to be fully evaluated for transportation in the final EA.

Page B-7. Appendix B. third paragraph

"...it is assumed that the uranium storage facility is a Hazard Category 2 facility...." The hazard analysis appears to assess storage in a Hazard Category 2 facility but not storage in the tension-support structures (TSS) or outside storage pads.

Page B-9, Appendix B

Please explain the blank line for the first bullet regarding breathing rate.

Page B-15, Appendix B, Table B.8

The calculations for public dose needs to be re-evaluated as the ETTP site is undergoing reindustrialization, members of the public are not restricted to outside the site fence boundaries.



BTATE OF TENNESSEE DEPARTMENT OF ENVIRONMENT AND CONSERVATION

Division of Radiological Health 3rd Floor, L & C Annex 401 Church Street Nashville, TN 37243-1532 615-532-0399

INTERNET: jkey@meil.state.tn.ue

March 11, 1999

Mr. David R. Allen, ORO NEPA Compliance Officer U.S. Department of Energy PO Box 2001, SE-32 Oak Ridge Operations Office Oak Ridge, TN 37831-B739

Dear Mr. Allen:

Thank you for the opportunity to review the Environmental Assessment for the Receipt and Storage of Uranium Materials from the Fernald Environmental Management Project Site. The Division of Rediological Health has the following comments about this document.

- 1. There are a number of special security considerations for the movement and storage of the LEU material. Since the Y-12 site currently stores some HEU and LEU, that site appears to be the best location for the storage of the LEU material if it is to be stored in Oak Ridge.
- 2. This proposal treats the uranium in question as a "product" but the only mention of an actual customer for the product is for the LEU. The State of Tennessee already contains hundreds of cylinders of Depleted Uranium in the form of UF6 which the Department insists can be marketed as a product, but for which they have been unable to find a buyer. While the UF6 situation is different because of the need to convert the Uranium to a usable form, the situation is similar.
- 3. In the proposal to store the material at K-25, the "co-located worker" is considered to be closer than the member of the public. This is not an accurate assessment of this site. Due to the reindustrialization of the ETTP site members of the public work at and visit this site regularly. The concept of a "co-located worker" for non-radiation workers is a DOE fabrication and is not recognized elsewhere.
- 4. The EA states that the intent is to get approval for storage of the material at "one or more site." If the intent of this statement is to leave several options open then we have no objection to this intention. If on the other hand the intention is to scatter the material to different sites then this causes us concern. Storing the DU and the HEU.

Mr. Allen Page 2 March 11, 1999

at different sites may be necessary but scattering the DU material to various locations appears inefficient. For example, using more than one site would require that personnel be hired and trained to monitor the material at each of the sites. This does not appear to be the most efficient use of resources. Some of the sites being considered, such as the Y-12 site, do not have enough storage space for all of the material. If a site cannot contain all of the DU material, then we do not think it should be considered for storage of this material.

- 5. The accident assessment for the ETTP site and specifically for the K-1088F site describes the worst credible accident dose to the public as a low dose. The dose calculated is 1.28 rem. This should not be considered a low dose. Evacuation of the public is recommended at a projected dose of greater than 1 rem.
- 6. On page B-9, the first bullet at the bottom of the page is incomplete. It contains a blank underlined space, which was most likely intended to be filled in. The information is included on the page but should also be included in the bulleted line.
- 7: On page B-11, a chart lists the distances to the site boundary from each building considered. This distance was used in the accident assessment as the distance to the nearest member of the public. Given the development of private enterprise on this site ETTP is a public site. Given this, the site boundary is not a reasonable measurement for this calculation for those three buildings. The accident assessment for all three buildings should be reevaluated, this includes the K1066F site which already represents the highest accident dose of 1.26 rem.
- 8. Page B-13 includes a table which lists radiological consequence level to the public and to workers and associates these with a descriptive word. A public dose ranging from >= 0.1 rem to <5 rem is described as having low consequences. This seems an unreasonably high range for a low consequence dose.</p>
- 9. Many of the proposed storage locations are not in the form of already existing buildings, but are empty lots on which Tension Support Structures (TSS) would be built. These buildings do not appear to be as secure as a real building. How reasonable is it to store this type of material in this type of building?

Sincerely,

Joelle Key Health Physicist